Systematic Notes on Asian Birds 2010

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Systematic Notes on Asian Birds 2010

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Aims and scope

Systematic Notes on Asian Birds is a collaborative project of the British Ornithologists'Club (BOC) and the Trust for Oriental Ornithology (TOO), focusing on the taxonomy and nomenclature of the birds of a broadly defined Oriental Realm. It is partly an invitational series, but the publishers also welcome independent submission of papers that fall within their area of interest. See the Foreword of this issue for further details.

Sales

Systematic Notes on Asian Birds is to be a regular publication. Current prices, delivery terms and ordering information will be made available at www.boc-online.org and may also be obtained from the publisher's office (address above).

Back issues

No back issues are available in hard copy but all papers of the Leiden series (see From the Publisher) may be downloaded, free of charge, from the Naturalis resources website: www.repository.naturalis.nl

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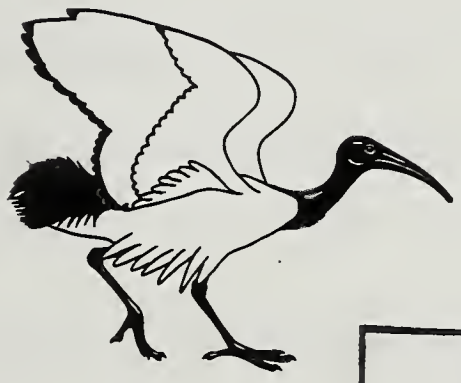
Systematic Notes on Asian Birds 2010

Exploring the taxonomy and nomenclature of the birds of a broadly defined Oriental Realm

Numbers 68–76
(A continuation of the Leiden series)

Edited by David R. Wells

BOC Occasional Publications No 5



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From the Publisher

Systematic Notes on Asian Birds ('SNAB') was launched in 2000 as a joint venture of the Nationaal Natuurhistorisch Museum (Naturalis), Leiden, and the Trust for Oriental Ornithology (TOO), under the editorship of R.W.R.J. Dekker, E.C. Dickinson and, latterly, D.R. Wells. Five issues appeared annually as parts 331, 335, 340, 344 and 350 of the journal *Zoologische Verhandelingen* and, after the merger of Leiden titles, a sixth was published in 2006 as part 5 of volume 80 of *Zoologische Mededelingen*.

A further revision of journal publishing policy by Naturalis then terminated the Museum's involvement. However, TOO remained committed to the series and entered into discussions about its future with the British Ornithologists' Club, for which avian systematics has always been a central interest. The outcome was a fresh agreement whereby the BOC will produce further issues of SNAB as part of its on-running *Occasional Publications* series. Under the new arrangement, copyright to bound issues resides with the BOC whereas TOO retains a right to the name and will continue to promote SNAB's aims and objectives—a collaboration attested by the logos of both organisations appearing together on the title page.

After a four-year gap, therefore, this issue marks a fresh departure for SNAB, but with continuity. The aims of the series as outlined in the Introduction to the year 2000 issue are upheld and numerical continuity of the papers in the series is maintained (here, 'Notes' 68–76), with David Wells continuing as editor. The cover title now includes the year and it is expected that issues will again appear regularly although, inevitably, the publisher must review reception of the venture by the wider ornithological community as evidenced from sales achieved.

Helen Baker
Chairman, British Ornithologists' Club

Editor's Foreword

History has been nothing if not eventful (see From the Publisher) but after a 4-year publishing gap *Systematic Notes on Asian Birds* is here continued as a title of the British Ornithologists' Club (BOC), in association with the Trust for Oriental Ornithology (TOO).

Scope and content remain in direct line of succession from the 2000–2006 TOO/Naturalis (Leiden) series, but emergence from the shelter of a host journal has made instant new demands on presentation, including, for a start, need of an independent series title and a cover design to go with it. However well settled in Asian ornithological circles, the 'SNAB' wording of the Leiden era was never other than a running header added to paper (Note) titles, under the umbrella name of the journal. It has been retained as such to allow for a continuation of the numbering of Notes, hence the decision to extend the same wording to the cover and title page of the new issue has meant a need to distinguish between uses. This has been limited to changing some capitals and, on the basis that BOC expects to publish regularly, adding a year date.

Developed in stages by Steve Dudley and eGreenWorks (Eng-Li Green), the cover design will not easily be missed, although background elements borrowed from other BOC publications, including the *BOC Bulletin*, are there to suggest the beginnings of a house style. Wildlife artist Martin Woodcock's front-cover symbol evokes a blue-and-orange male of the taxonomically notorious endemic muscicapid flycatcher genus *Cyornis*,

THE AREA COVERED

selected as representative of the challenges of an increasingly pressured but still heavily under-researched Oriental avifauna. Between covers, the shift to Palatino type-face and more streamlined, slightly more space-saving double-column text format has turned the publication gap and switch to new production arrangements into a style opportunity.

The editors of the first issue of SNAB (Dekker & Dickinson 2000) introduced a '... series dealing mainly with the taxonomy and nomenclature of the birds of a broadly defined Oriental Region [reaching] Pakistan and Afghanistan in the west, China (including Tibet) and Korea in the north, Japan in the east and Sri Lanka and Indonesia [as far as Lydekker's Line, marking the edge of the Australasian Sahul Shelf] to the south'. At least in terms of what was and was not to be included in the series' regular types materials compilations (see on), that boundary was held to throughout the Leiden era. In other respects, 'broadly defined' sensibly came to imply fuzzily defined, to cope with cross-border distributions and relationships and, in particular, the well-known penetration of a largely migratory Oriental fauna into far-eastern Russia, etc. That step is upheld, and decisions on the geographical inclusiveness of submissions will continue to be judged individually. The boundary map in the first (2000) Introduction also included Mongolia but actually left out Afghanistan and even though that country is normally classed as yet another part of the Palaearctic, in the spirit of fuzziness, this omission is now made good.

While SNAB has relied on soliciting review papers from specialists in their field, and will hope to continue with this, the expectation has been that as the name became established researchers with contributions to make would see fit to invite themselves. This has begun, and the ambition now is that the 'invitational' side of the original terms of reference shall at least be balanced by submissions attracted independently. Much will depend on staying with a regular publication schedule and, of course, on assuring the maintenance of a normal, international system of peer review.

The five issues of the Leiden era published papers in six categories, loosely defined as follows:

(1) *Preliminary reviews*. Starting with passerines, and a founding objective of the series, family-by-family reviews of taxonomy and nomenclature up to genus level, aimed at correcting and updating the treatments of the J.L. Peters *Check-list of Birds of the World* series. Subject themselves to on-going research, these reviews seek to pinpoint omissions, errors, and entrenched grey areas, although only one (SNAB 36: Wells, Dickinson & Dekker 2003 on leafbirds, family Chloropseidae) formally shifted accepted species boundaries and introduced new scientific names. For obvious reasons, the families covered by these and the next, linked category of papers have appeared in 'Peters' sequence, although nothing about the rest of SNAB content is necessarily tied to that system. (Titles to 2006, 13).

(2) *Types compilations*. Published in parallel with *Preliminary reviews*, listings that allow researchers to know where amongst the world's museums representative type material is deposited. They cover complete synonymies (i.e., go beyond the confines of Peters's *Check-list* treatments) wherever possible checked for accuracy back to the original citation, identify authority and description date and, as needed, supply a technical commentary (12 titles).

(3) *Taxonomic revisions and realignments*. Mainly to not above (biological) species-limit level; targeted treatments independent of Peters's sequence that emphasise an integrated evidential approach. Topics mostly, but not all, passerine (ten titles).

(4) *Nomenclatural revisions*. Dealing mostly with passerines: the identification/re-identification of type material, type localities, priority and name allocations, with actions taken or recommended (17 titles).

(5) *Bibliographic research*. Typically on topics around source publications, issue dates and authorships (ten titles).

(6) *History of collectors and collections*. Narrative, but with fallout, e.g., for the identification of type material and what follows from that (five titles).

SNAB 2010 features five of these categories. With this issue the Peters's *Check-list* review programme reached the babbler complex: taxon-rich, predominantly Oriental, long guessed to be polyphyletic, and recently the subject of molecular taxonomic analysis that is revealing far more phylo-structure than ever suspected. Considered too large (and currently too contentious) for one traditional family-scale review, for the first time the task has been split between an overview (Cibois *et al.*) that sets out updated understanding of family and (as far as yet possible) generic limits within the complex, and detailed review (Dickinson & Cibois) of one part of one subfamily of the newly re-defined Timaliidae—to be followed up in future issues. A family review of grebes (Mlíkovský) breaks the Peters sequence mould, thereby setting a precedent, and both of these exercises are accompanied by types compilations (Dickinson *et al.*, Mlíkovský).

Targeted systematic revisions cover morphological variation in a nuthatch *Sitta villosa* at the far NE fringe of SNAB territory (Nazarenko *et al.*), and the single largest submission ever invited by SNAB: an integrated evidential review of taxon limits and relatedness among Oriental *Phylloscopus* and *Seicercus* leaf warblers (Martens), encompassing and updating a now-extensive literature. Targeted nomenclatural revisions feature a babbler neotypification issue (Dickinson & Cleere), and a quasi history category paper raises both taxonomic and nomenclatural issues linked to collections made on the W Indonesian island of Bangka (Mees).

Taken as a whole, this list gives just a flavour of the interests that will continue to be pursued, but category definitions are far from water-tight and the call is out for more submissions across the whole field, including for SNAB 2011. In the meantime, 2010 authors are offered a proper apology for delivery of the current issue having been delayed some four months beyond the date planned and expected.

Stepping back, this is an appropriate moment to recognise and, on behalf of all parties, salute the scientific staff and administrators of Naturalis, Leiden, for their role in helping to set SNAB up and then hosting publication over the first seven years of its existence. Sincere thanks are also due to the Joint Publications Committee of the British Ornithologists' Union and BOC for key assistance at the teething stages of the new publication arrangement. All who made time to referee the papers considered for SNAB 2010 are likewise gratefully acknowledged, those who agreed to be named being Mark Brazil, Murray Bruce, Nigel Collar, Geoffrey Davison, Tim Inskipp, Paul Leader, Mary LeCroy, Clive Mann, Frank Steinheimer and Michael Walters.

David Wells

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SYSTEMATIC NOTES ON ASIAN BIRDS: 68

An overview of the babblers and associated groups

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ABSTRACT Recent findings, mainly of molecular taxonomy as this affects understanding of the phylogeny and family limits of babblers, and the number of families these are currently thought to comprise, are brought together in one reference. This large group is now divided into the families Sylviidae (*Sylvia* and allies) and Timaliidae (the core babblers, including the white-eyes). Within the latter, four subfamilies are recognised: Zosteropinae, Timaliinae, Pellorneinae and Leiothrichinae. Several Asian taxa: *Pteruthius, Pnoepyga, Erpornis* and *Eupetes*, traditionally classified as timaliids are not related to this group. Conversely, *Graminicola* and *Rhopophilus*, taxa previously treated as Old World warblers, have been shown to belong, respectively, to the newly defined Timaliidae and Sylviidae.

KEY WORDS babbler, convergence, molecular markers, Sylviidae, taxonomy, Timaliidae.

INTRODUCTION

The babblers, family Timaliidae, are an important group of Old World insectivorous passerines (del Hoyo *et al.* 2007). As constituted in the following synthesis they comprise more than 400 species, primarily of forest birds, distributed for the most part in South and Southeast Asia, and Africa. Morphological features generally attributed to them include unspotted juvenile plumage, scutellated tarsus, presence of rictal bristles, and a double humeral fossa. They usually have a single annual moult, and in the majority of species the sexes are alike. Most of these non-migratory birds also exhibit a marked degree of sociality, manifesting itself in various ways. Thus babblers often gather or may associate permanently in parties and flocks, and some species are cooperative breeders (Gaston 1977, 1978). Individuals of most babblers also clump together when perched during the day and while roosting at night, and mutual preening has been observed in many species (Collar & Robson 2007, Simmons 1963). Despite these behaviours in common, the babblers display great morphological and ecological diversity (Delacour 1946), and the systematics of the Timaliidae and related Old World insectivorous passerines have been particularly difficult (see review in Sibley & Ahlquist 1990). We here present a general overview of the recent studies of babblers based on molecular markers that have led to a new definition both of family limits and internal taxonomy. The focus is on the Asian assemblage but for completeness we present information on additional African, Malagasy and Australasian taxa previously classified as babblers that have since been excluded from the Timaliidae.

TAXA PREVIOUSLY TREATED AS BABBLERS THAT HAVE OTHER ORIGINS

Sibley & Ahlquist (1990) were the first to use molecular markers (DNA–DNA hybridization) to define the Timaliidae, and excluded the Australasian genera *Garritornis* and *Pomatostomus* from the true babblers as belonging in Parvorder Corvida rather than the Passerida. This result was confirmed using DNA sequences (Edwards & Arctander 1997, Edwards *et al.* 1991). In Madagascar, a large number of passerines that were thought to belong to several widespread families in fact form an original radiation endemic to the island. Two species previously classified as

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timaliids belong in this endemic clade: *Oxylabes madagascariensis* and *Hartertula flavoviridis* (sometimes placed in genus *Neomixis*) (Cibois *et al.* 1999, 2001). Another putative Malagasy babbler, *Mystacornis crossleyi*, is actually a vanga (Johansson *et al.* 2008). The remaining Malagasy 'babblers' of the genus *Neomixis* belong to the Cisticolidae (Nguembock *et al.* 2007).

In Africa, three putative babblers, *Kakamega poliothorax, Arcanator orostruthus* and *Modulatrix stictigula*, form their own distinct group within the superfamily Passeroidea (Johansson *et al.* 2008). This group (*Kakamega* not included in the analysis) was inferred as sister to the sugarbirds, *Promerops*, by Barker *et al.* (2004) and Beresford *et al.* (2005) but that relationship was not corroborated in the results of Johansson *et al.* (2008). Further studies will be needed to explain the discrepancy between data sets. Finally, the morphologically odd *Picathartes* and *Chaetops* (including *Achaetops*), which were for a time placed among babblers, form their own clade at the base of the Passerida (Barker *et al.* 2004, Beresford *et al.* 2005).

Several Asian taxa have recently also been excluded from the core babbler assemblage. The Eurasian *Panurus biarmicus* was removed from typical babblers by Cibois (2003b). Its position within the Passerida has been further defined in phylogenies inferred from extensive taxon sampling, and Alström *et al.* (2005) and Johansson *et al.* (2008) have suggested a hitherto unsuspected relationship between *Panurus* and larks (Alaudidae). The large discrepancy between this genetically defined sister-group relationship of larks and *Panurus* and their relative morphological and ecological features is comparable to the gap between *Pseudopodoces humilis*, a ground-dwelling bird, and its closest relatives, the Paridae (James *et al.* 2003).

The enigmatic *Eupetes macrocerus* of the Thai-Malay Peninsula, Sumatra and Borneo has been associated variously with *Ptilorrhoa* in New Guinea and the *Picathartes* 'babblers' in Africa. Jønsson *et al.* (2007) showed that *Eupetes* indeed is closely related to the *Chaetops*/*Picathartes* group (which does not include *Ptilorrhoa*), indicating it to be another relic of a group basal in the Passerida.

Erpornis zantholeuca, previously placed in genus *Yuhina*, is not closely related to the other yuhinas despite morphological similarities, or indeed to any other babblers (Cibois *et al.* 2002). It belongs in the superfamily Corvoidea radiation and, along with the 'shrikes-babblers', genus *Pteruthius* (Reddy 2008, Reddy & Cracraft 2007), probably represents a sister-group to vireos. *Erpornis zantholeuca* differs from the yuhinas in its bill shape, which is more conical, and in its yellow-green plumage coloration, otherwise not found among yuhinas. Harrison (1986) argued that the bill of this taxon is very similar to that of the tree babblers and that this species should belong to the genus *Stachyris*. However, DNA results suggest that the morphology and ecology of *E. zantholeuca* are merely convergent on those of true babblers.

Unlike typical babblers, *Pteruthius* species are sexually dimorphic but they were still long classified as timaliids. The newly defined vireonid clade in which they have now been placed thus includes both Asian and New World taxa. It is located among the basal-most divergences within the core Corvoidea, suggesting that it may be one of the earliest corvoid groups to have reached Asia, presumably from Australasia, the global corvoidean centre of origin (Reddy 2008).

Cibois (2003b) suggested that the babblers that share generally wren-like morphology and terrestrial habits, the so-called 'wren-babblers', do not form a monophyletic group. This result has been confirmed by Gelang *et al.* (2009), who also found evidence that the 'wren-babbler' genus *Pnoepyga* falls well outside the true babbler radiation. As *Pnoepyga* species display non-social behaviours (Collar & Robson 2007) and show a unique combination of morphological and genetic characters, Gelang *et al.* have proposed recognition of a family Pnoepygidae. Its relationships within the greater Sylvioidea superfamily, however, remain to be investigated.

Finally, the enigmatic *Malia grata* from Sulawesi is still of unclear origin and, so far, has not been sampled in molecular phylogenies. Delacour (1946) placed this taxon in the babblers but also suggested that it may

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be related to other passerines, such as bulbuls (Pycnonotidae). Two other Sulawesi endemics also have the potential for being babblers: *Geomalia heinrichi*, which was thought to be allied to *Malia* as suggested by its name, and *Cataponera turdoides*, which presents some morphological similarities with *Garrulax* (Desfayes 1967).

NEW ADDITIONS TO THE BABBLERS

Sibley & Ahlquist were the first to suggest that the genus *Sylvia* is embedded among babblers. They also proposed the white-eyes (Zosteropidae) to be sister to the babblers and *Sylvia* together. Several studies based on DNA sequence data have since confirmed the close relationship of both *Sylvia* and *Zosterops* with babblers (Alström *et al*. 2005, Barker *et al*. 2004, Cibois 2003b, Fjeldså *et al*. 1999, Gelang *et al*. 2009). This inclusion of *Sylvia* among babblers generated a taxonomic problem as *Sylvia* is the type genus of family Sylviidae, Leach 1820, and well established for warblers whereas Timaliidae, Vigors & Horsfield 1827, is the name commonly used for babblers. The traditional family Sylviidae has been proven to be highly polyphyletic (Alström *et al*. 2005) although the name Sylvioidea is still frequently used at higher taxonomic level for the well-supported clade that includes all the 'warbler-like' families and other groups, from babblers to larks (see, for instance, Barker *et al*. 2004, Johansson *et al*. 2008). Suppression of the name Sylviidae as suggested by Cibois (2003a) nevertheless proved to be problematic. An alternative solution, favoured by Gelang *et al*. (2009), organizes the babbler radiation into two families: Sylviidae (restricted to *Sylvia* and closely related taxa) and Timaliidae. A separate resumé of these two groups is given below.

Additional to *Sylvia* and the white-eyes, Alström *et al*. (2005) suggested that the babbler radiation also includes two Asian 'warbler-like', monospecific genera, *Graminicola* and *Rhopophilus*, previously placed, respectively, in Megalurinae (Sylviidae) and Cisticolidae (Dickinson 2003). Placement of the aberrant, nectar-adapted *Myzornis pyrrhoura* within the newly defined Sylviidae is proposed by Gelang *et al*. (2009), along with the only New World representative, *Chamaea fasciata* (Barhoum & Burns 2002, Cibois 2003b), and two African taxa, *Lioptilus nigricapillus* (Johansson *et al*. 2008) and *Parophasma galinieri*. Finally, Voelker *et al* (2009) have shown that *Horizorhinus dohrni*, an endemic of Principe Island, Gulf of Guinea, formerly considered to be either a thrush or a babbler, belongs in the genus *Sylvia*.

SYSTEMATICS OF THE SYLVIIDAE (*SENSU* GELANG *ET AL*. 2009)

A number of the taxa already mentioned belong within the newly defined Sylviidae, i.e., *Sylvia* (including *Horizorhinus*) and its close African relative *Parisoma* (Shirihai *et al*. 2001), *Myzornis*, *Rhopophilus*, *Chamaea*, *Parophasma* and *Lioptilus*. This clade also incorporates birds previously classified as core babblers, including African *Pseudoalcippe* (Cibois 2003b, Johansson *et al*. 2008) and several Asian taxa: *Chrysomma sinense*, the parrotbills *Paradoxornis* (which may not be monophyletic and, according to Gelang *et al*. 2009, includes *Chamaea*), and several fulvettas (genera *Fulvetta* and *Lioparus*) previously placed in the genus *Alcippe* (Pasquet *et al*. 2006). The genus *Moupinia* (2 species) has not been sampled so far in molecular phylogenies but on the basis of morphological affinities with *Chrysomma* it, too, is likely to belong in this clade.

SYSTEMATICS OF THE TIMALIIDAE (*SENSU* GELANG *ET AL*. 2009)

Four subfamilies are recognised: Zosteropinae, Timaliinae, Pellorneinae and Leiothrichinae.

The Zosteropinae includes the white-eyes, the genus *Yuhina* (except, as pointed out, species *zantholeuca*), and a group of babblers endemic to the Philippines archipelago previously placed in the genus *Stachyris* (Cibois 2003b). This clade was also recovered with good support in an analysis that included a dense taxon sampling among white-eyes (Moyle *et al*. 2009), and Moyle *et al*. suggest that the Philippine '*Stachyris*' are actually embedded among white-eyes. They also suggest that *Yuhina* may not be monophyletic, rather that its parts branched

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off sequentially from the base of the timaliid radiation. Cibois *et al.* (2002) found that the Philippine '*Stachyris*' clade emerged as sister to Bornean *Yuhina everetti*, hence suggested that its radiation may have originated from Borneo. However, this relationship has not been supported in analyses with denser taxon sampling (Moyle *et al.* 2009, Zhang *et al.* 2007).

Additional to *Timalia*, the type genus of the family and subfamily, the Timaliinae includes most of the remaining species of *Stachyris* (even without the Philippine component, not a monophyletic genus), *Macronus*, *Dumetia*, the scimitar babblers *Pomatorhinus* and *Xiphirhynchus*, and wren-babblers of the genus *Spelaeornis* (Cibois 2003b, Gelang *et al.* 2009, Moyle *et al.* 2009). *Rhopocichla* and *Micromacronus*, not sampled yet, are provisionally considered part of this subfamily.

The Pellorneinae includes all of the remaining fulvettas yet tested (Pasquet *et al.* 2006), jungle babblers in the genera *Pellorneum*, *Malacocincla* and *Malacopteron*, and the rest of the 'wren-babblers': *Napothera* (including *Turdinus*), *Jabouilleia*, *Rimator* and *Kenopia*. Two jungle babbler genera, *Leonardina* and *Trichastoma*, are not yet sampled, as also *Ptilocichla* and *Sphenocichla*. All are included provisionally in this subfamily, which also covers African *Illadopsis* and *Ptyrticus*, and the newly added *Graminicola* mentioned above (Cibois 2003b, Gelang *et al.* 2009).

The Leiothrichinae comprises song babblers (*Cutia, Leiothrix, Heterophasia, Liocichla, Actinodura, Minla*), laughingthrushes (*Garrulax* and *Babax*) and ground babblers (*Turdoides*). The genus *Garrulax* has proved to be polyphyletic (Cibois 2003b, Gelang *et al.* 2009, Luo *et al.* 2009) and its taxonomy is under further investigation. *Minla* is also probably not a monophyletic genus (Cibois 2003b). Two African genera, *Kupeornis* and *Phyllanthus*, are part of this clade, closely related to *Turdoides*, and on the basis of morphological similarities Asian *Crocias*, not sampled yet, could provisionally be placed here.

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SYSTEMATIC NOTES ON ASIAN BIRDS: 69

A preliminary review of the babbler subfamily Pellorneinae, part 1

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ABSTRACT Lacking the space to address all of subfamily Pellorneinae as recently re-defined (see Cibois *et al.*, this issue), we here report on the 23 species historically considered under that label. Sampling of timaliids for molecular analysis has not been sufficient to allow any revision yet of generic limits in the section covered, although changes at this level are to be expected when enough is known.

KEY WORDS acoustics, babbler, molecular studies, Pellorneinae, species limits, type species.

INTRODUCTION

This series of preliminary reviews of systematic issues continues with the first of those needed to reflect the assemblage of babblers treated by Deignan (1964) as the Timaliinae in volume 10 of Peters's *Check-list of Birds of the World* and as the Timaliidae by Dickinson (2003).

Molecular studies have shown that Deignan's assemblage requires considerable change. Some birds once perceived to be babblers now fit better elsewhere and other groups not then included, such as the white-eyes (Zosteropidae) and warblers of the genus *Sylvia*, have been shown to be better placed within it. This has resulted in substantial alteration to the definition especially of its newly incorporated family, Sylviidae.

Changes have been summarised up to date in the preceding paper by Cibois *et al.* (2010). In this, they set out the higher groupings among which genera as now understood from molecular data need to be dispersed, and note the larger gaps in taxon sampling still to be filled. Where these gaps remain at traditional whole-genus level we note that they are liable to cause deferment in acceptance of revisions of systematic placement.

Studies of the Pellorneinae suggest that this subfamily holds sections of the 'fulvettas' (lumped by Deignan in genus *Alcippe*), some of the 'wren-babblers' of Delacour (1946) (*Napothera, Jabouilleia, Rimator* and *Kenopia*) and some—provisionally all—of his 'jungle babblers' (genera *Malacocincla, Trichastoma, Pellorneum. Leonardina* and *Malacopteron*).

We regret that space available here allows treatment of only a part of the Pellorneinae. As such, it makes sense to begin with those genera that were clustered into tribe Pellorneini by Delacour (1946), and so maintained by Deignan (1964). Keep in mind however that, as Cibois *et al.* (2010) show, these are unlikely to form an exclusive clade and that there will be interesting additions when the rest of the subfamily is discussed. Note also that molecular sampling of this group has yet to fill some large taxon gaps (see Appendix). These will require attention before clades can be defined with a high level of confidence.

TAXONOMY ABOVE THE SPECIES LEVEL

The genera *Leonardina, Pellorneum, Trichastoma, Malacocincla* and *Malacopteron* comprise 23 species distributed through South and Southeast Asia including Sri Lanka and the Greater Sundas and Palawan (on the last of which one *Malacocincla* and one *Malacopteron* occur). One species, seen as a representative of *Trichastoma*, occurs on Sulawesi and off-lying islands but nowhere further into Wallacea, and one other elsewhere in the Philippines (monotypic *Leonardina*, endemic to Mindanao). The latter has

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not yet been included in any molecular analysis and, for zoogeographical reasons, placement here is open to considerable doubt.

The difficulties of understanding this group's nomenclature are amusingly well illustrated by species *pyrrogenys* (Temminck, 1827) which brings together five names, four being those of its races, the fifth in synonymy. One each of these was described in genera *Myiothera, Aethostoma, Malacopterum* [sic], *Malacocincla* and *Turdinus*; none at all in either of the two, *Pellorneum* and *Trichastoma*, to which recent authors have ascribed this species.

Historically, genera *Leonardina, Pellorneum, Trichastoma* and *Malacocincla* seem to have been grouped by virtue of living at a common low level in closed forest. *Leonardina* and core *Pellorneum* species are foragers on the ground. 'Other' *Pellorneum* species, *Trichastoma* (except for *bicolor*) and *Malacocincla* forage both on the ground and in the lowest levels of vegetation. Also, all these birds tend to live in pairs, only temporarily in family parties, and typically do not join mixed foraging flocks (Kennedy *et al.* 2000, Robson 2000, Wells 2007). By contrast, *Malacopteron* species, and *Trichastoma bicolor*, are birds of understorey vegetation, up into the mid levels of forest. *Malacopteron* species are also more regularly social and do join mixed foraging flocks, although aberrant *M. albogulare* (Blyth, 1844) seems not to do so (Wells 2007). According to Ripley & Beehler (1985a), nowhere in the group are current assignments to genus a predictor of nest site or type (on or above ground, domed or open cup, etc.).

This group of babblers was last reviewed as a whole by Ripley & Beehler (1985a), using a method of scoring morphological and behavioural characteristics. Most of their conclusions were followed, e.g., by Robson (2000), Dickinson (2003) and Collar & Robson (2007) although one of us (ECD) preferred to retain the monotypic genus *Leonardina* (Dickinson 2003, Kennedy *et al.* 2000). Wells *et al.* (2001) declined to transfer species *tickelli* and *pyrrogenys* to *Pellorneum*, and Collar & Robson (2007) resurrected the monotypic genus *Ophrydornis* for an aberrant species of *Malacopteron*.

We have used the term 'core' *Pellorneum* above and referred to 'others'. Core are *albiventre* Godwin-Austen, 1877, and *palustre* Gould, 1872, the type species *ruficeps* Swainson, 1832, and close to this: *fuscocapillus* Blyth, 1849, and perhaps *capistratum* Temminck, 1823. The 'others' we refer to are *tickelli* Blyth, 1859, *pyrrogenys* Temminck, 1827, and *buettikoferi* Vorderman, 1892 which Wells *et al.* (2001) and Wells (2007) retained in a broad genus *Trichastoma* that subsumed *Malacocincla*, reverting to the treatment of Deignan (1964). Molecular data suggest that *Pellorneum ruficeps* and the species *tickelli* are not closely related (Cibois 2003), and that the genus *Pellorneum* as applied by Dickinson (2003) needs revision. However, Cibois (2003) did not sample sufficient species to offer more than a preliminary indication.

The list of taxa sampled in molecular genetic studies shown in the Appendix demonstrates that the phylogeny of these genera has only been modestly investigated, and that a significant analysing effort is still needed for the 'jungle babblers'. Note particularly that the type species of genus *Trichastoma* has not been sampled, and that the implied need to reassign species *tickelli* will not be helped by this. Provisionally, *tickelli* could be returned to a broad genus *Trichastoma* as Wells (2007) proposed, but we do not yet know whether the genus *Malacocincla*, the type species of which has been sampled, can be sustained as separate. We prefer to keep this so for the moment, thus we defer moving *tickelli*. When it moves, of course, it would be desirable to know which other species should move with it.

There may be a case for accepting *Ophrydornis*, as has been done by Collar & Robson (2007), although the species *albogulare* has not yet been analysed genetically.

Collar (2006) felt that generic re-attribution was desirable for some babblers without waiting for molecular evidence, and detailed morphological work underlying the publication of Wolters (1980) may well point in the right direction. Perhaps because the probability of discovering a cryptic sibling species among babblers has seemed low, acoustic evidence,

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mainly collected by ornithologists seeking to draw birds into view in the field, has not yet been collated to assist with the exploration of species limits. A notable exception is the use of such evidence by Wells *et al.* (2001).

Given the variety of issues that needs to be addressed we prefer to wait on more comprehensive evidence from molecular studies, including of the species that are the types for their generic names, to use in conjunction with morphological, acoustic and other evidence (in this context see Eck & Martens 2006). For now, therefore, we propose no changes at generic level within this group and retain the treatment in Dickinson (2003). Throughout, we rely upon spellings recommended by David & Gosselin (2002a, b), as were used by Dickinson (2003). Note also that, as is usual in this series, views adopted here have been injected into the associated paper on the types (Dickinson *et al.* 2010).

TAXONOMY AT AND BELOW SPECIES LEVEL

The following four taxa relevant to genera in hand have been described as new since Deignan (1964): *Pellorneum ruficeps pallidum* Abdulali, 1982; *Pellorneum ruficeps dusiti* Dickinson & Somtob Chaiyaphun, 1970; *Brachypteryx cryptica* Ripley, 1980[1] and *Malacocincla abbotti krishnarajui* Ripley & Beehler, 1985b.

Comments at subspecies level are made only as deemed to be needed (the full list of subspecies appears in the following paper on types and synonymy), and no comments at all have been found to be needed in respect of species *Leonardina woodi* (Mearns, 1905), *Pellorneum palustre* Gould, 1872, *Trichastoma bicolor* (Lesson, 1839), *Malacocincla cinereiceps* (Tweeddale, 1878), *Malacopteron magnirostre* (Moore, 1855), *Malacopteron cinereum* Eyton, 1839, *Malacopteron magnum* Eyton, 1839, and *Malacopteron palawanense* Büttikofer, 1895.

Pellorneum albiventre (Godwin-Austen, 1877):
Distributed locally from southeast Bhutan, south and east through Bangladesh, eastern Assam and Burma to northern Thailand, southern China and parts of Laos and Vietnam.

Rasmussen & Anderton (2005) mentioned suggestions that this species, or at least some of its populations, was perhaps dimorphic. It would seem that the difference between juvenile and adult plumages may explain this past opinion. However, Rasmussen & Anderton found a large, statistically significant difference in tail-length between (short-tailed) *P. a. ignotum* (Hume, 1877) and long-tailed nominate *albiventre*, leading them to suggest that two distinct species may be involved. More of the apparently scattered populations of this bird need to be explored and, in particular, acoustic information expanded. Harington (1909), Baker (1922) and Stresemann & Heinrich (1940) reported nests and eggs, and there may now be additional data that will help in making a clearer assessment.

Pellorneum ruficeps Swainson, 1832:
Widespread from India eastwards to Yunnan and almost all of mainland Southeast Asia, south to the mid Thai-Malay Peninsula.

This species has had the curious distinction of being presumed over-split by some and capable of further subdivision by others. Bringing together 339 specimens from seven United States museums, Deignan (1947) reported that 'considerable variation usually treated as individual has proved to represent true subspeciation', although some of the populations identified, many of which he named, have yet to be further explored. His view initially astonished Delacour, but the latter was soon persuaded that this was indeed a very plastic species and described two new subspecies of his own, from Vietnam (Delacour 1951). As more material accumulated Deignan (1951, 1956) described yet others.

There is a fairly common belief that, in general, Deignan's subspecies are hard to appreciate. An example of this can be found in the rejections of many of his eurylaimid subspecies (Dekker & Dickinson, 2000). To

[1] An unfortunate misidentification; actually a known race of *Pellorneum tickelli*. See Ripley (1985) for a retraction.

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what extent that has been due to the proportion of his original samples re-examined by later commentators or to the difficulty of bringing them together again is hard to say. Certainly, most of the material Deignan had in the United States was relatively fresh and with excellent label data; whereas trying to critique such studies from the generally much older resources, e.g., of NHM, Tring, presents a problem. It is more or less essential, now, that these latter be complemented. Provisionally, however, we continue to support the view that *ruficeps* is a species that has formed small, distinct populations rather easily.

In 1968, collections made at Thung Salaeng Luang National Park required identification. This park, then newly gazetted (having been explored botanically only four years earlier), lies between the Thai central plain to its west, the eastern plateau to the east and the more mountainous area of northern Thailand to its north. The Dong Phaya Fai hill range in which it lies is essentially a southern spur of those northern mountains. Specimens collected there were compared with material available in the Boonsong Lekagul collection, Bangkok. Subspecies represented in this collection appeared initially to be: possible *'subochraceum'* Swinhoe, 1871 (one from Mae Hong Son[2], although this taxon had not previously been reported from Thailand), *'chthonium'* Deignan, 1947 (five from three localities: Pa Paa, Chieng Mai province, and Ban Leeh and Ban Pa Tung, Pua, Nan province); *elbeli* Deignan, 1956 (four from Chieng Khan, Loei province); *euroum* Deignan, 1947 (two from Nakhon Ratchasima and Saraburi provinces); and *acrum* Deignan, 1947 (seven from Bang Non, Ranong province and Tub Sakae, Prachuap Khiri Khan province). These were all small samples but the Thung Salaeng Luang birds appeared to differ from every one of them, despite the fact that specimens from Loei were probably taken at no great distance to the east, on the other side of the hills. After a later comparison with much more material at USNM, Washington, D.C. it was decided that the population at Thung Salaeng Luang deserved recognition. Subsequently, it was named *dusiti* Dickinson & Somtob Chaiyaphun, 1970, with a range stretching north to include birds from the two Nan province localities associated in the Lekagul collection with *chthonium*.

In addition, at the time, because specimen material from Bangkok and Washington laid out against a map of Thailand, despite some individual variation, did not appear to vary clinally, ECD became convinced that the filling of geographic gaps in collection coverage would eventually add several more forms in need of recognition to the eight listed for the country by Deignan (1963). The species is not particularly vagile, and does not attain significant altitudes, so that populations may be barred from meeting by intervening high ground. Also, in recent times, gene flow is likely to have been further reduced across low ground where forest habitat has been replaced by agriculture and other open land-uses. The Mae Hong Son specimen was confirmed as *subochraceum* and duly listed by Dickinson & Somtob Chaiyphun (1970), although they did not explicitly refer to its being a subspecies new for Thailand.

By contrast, Ripley (1982) was perhaps never fully convinced that variation was anything but largely individual and, after further collecting in Arunachal Pradesh, placed two races from Assam (*chamelum* Deignan, 1947, and *ripleyi* Deignan, 1947) in synonymy. Subsequently, Rasmussen & Anderton (2005), who recognised 'marked' variation between races, restored these, and we accept their judgement.

Further south in India, Abdulali (1982) separated the birds of the east side of the Peninsula from those of the Western Ghats as *pallidum*, and Rasmussen & Anderton (2005) have noted that 'further study [is] needed over [the] entire Peninsular range'. We have found no reason to reject *olivaceum* Jerdon, 1839 in favour of *granti* Harington, 1913 as the name

[2] A specimen then lacking a register number that had been collected on 3 September 1955

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chosen by Rasmussen & Anderton (2005) for the birds of Kerala.

Pellorneum fuscocapillus (Blyth, 1849):
Endemic to Sri Lanka. The southernmost form described (*scortillum* Ripley, 1946) was placed in the synonymy of the nominate form by Collar & Robson (2007: 195). This leaves the latter as the darker, more saturated bird of the wet zone, contrasting with paler *babaulti* Wells, 1919, a dry zone form from the north. The southern bird is actually darker where *scortillum* was collected than where *fuscocapillus* has its restricted type locality, close to the periphery of the range of the taxon.

Pellorneum tickelli (Blyth, 1859):
From eastern Assam to southern Yunnan south along forested hill ranges of Burma and western Thailand to Peninsular Malaysia; also of Laos and Vietnam.

There is here an abuse of nomenclature that has continued for some 80 years but is best now exposed and corrected. This relates to the birds of Assam. Recent works (Collar & Robson 2007, Rasmussen & Anderton 2005) make clear that there may be two distinct populations in that area, and mention *assamense* Sharpe, 1883 (which name they use as valid pending any such split being formalised) and *garoense* Godwin-Austen, 1874. Should they not be distinct, the name *garoense* has precedence.

The root of this problem, although not the commission of the error, appears to have been in the details of how Sharpe (1883: 557, 558) introduced the name *assamensis*. In page sequence, Sharpe's first act was to describe *assamensis* with '*Turdinus garoensis* Godwin-Austen, 1876' listed in its synonymy. This is followed a page later by his treatment of *garoensis* Godwin-Austen, 1874 as a synonym of nominate *tickelli*. However, Sharpe did not spell out here that he included birds from the Garo Hills in nominate *tickelli*. Instead, in his habitat statement he mentioned only Burmese locations 'Hills of Karen-nee, Pegu and Tenasserim'. Now, the type of *garoensis*, taken in 1872 or 1873, is from the Garo Hills—in Assam, not in Burma. Sharpe's two known types of *assamensis* are from the Dikrang valley[3] (one of these is a Godwin-Austen specimen collected in December 1874, and by inference any other appropriately dated specimens in Godwin-Austen's collection from the Dikrang valley would qualify as further syntypes) and the other from Dhollah, collected by J. Cockburn and received from E.W. Oates. Thus Sharpe's name is not an objective synonym of Godwin-Austen's. Both names have type localities in India and either both must be recognised or the senior name must be used for the whole Assamese population. It should be made possible for both names to be used in case the two populations are distinct and taxa need their own names.

The situation that Sharpe unintentionally created began to cause problems when Baker (1922: 247–248) gave nominate *tickelli* a range that included 'Assam South of the Brahmaputra, but not East of the Naga Hills ...' and gave *assamensis* a range 'Eastern Assam, North and South of the Brahmaputra'. A little later, Baker (1930: 48) confirmed that he had kept *garoensis* in the synonymy of the nominate form.

To later authors this apparent conflict of range statements was not acceptable. What form did occur in which hills south of the Brahmaputra? In answer to this, Ripley (1961: 348) removed nominate *tickelli* from the Indian list and had *assamensis* 'north and south of the Brahmaputra'. Deignan (1964: 248) repeated this and made no mention of *garoensis* anywhere in his synonymy, and Ripley (1961, 1982) omitted it too.

P. C. Rasmussen and ECD have discussed this in the past and agreed that more study is needed, but we have not sufficiently explored whether there are good diagnostic differences,

[3] Two Dikrang rivers, both ultimately northern tributaries of the Brahmaputra, have been identified in Assam: one flowing off the Dafla hills of Papum Pare district, Arunachal Pradesh, onto the Lakhimpur plain (Anwaruddin Choudhury pers. comm.), the other further east joining the Dibang branch of the main river north of Sadiya town (H.W. Wells *per* D.R. Wells). Which applies here has yet to be determined.

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or what ranges might be assigned to these two forms were both to be recognized. Although the name *garoensis* has probably not been used validly, i.e., for a recognised taxon, since 1899 there has been a clear indication that this name (*garoense* in neuter form in the genus *Pellorneum*) may be required and that using it would be more helpful than declaring it a *nomen oblitum*. Art. 23.9. of the International Code of Zoological Nomenclature (hereafter 'the Code') (ICZN 1999) applies here, and we note that the final sentence of Art. 23.9.2 states 'In the case of subjective synonymy, whenever the names are not regarded as synonyms the older name may be used as valid'. This is precisely the situation met here: the two names have been subjective synonyms but their types and type localities are quite different. As such, as long as the two are united as one it would seem perfectly proper to reassert the rule of priority and use *garoense* as the valid senior name of this population.

Pellorneum pyrrogenys (Temminck, 1827):
Resident in Borneo and Java but absent from Sumatra and the mainland of southeast Asia. As mentioned in the Introduction, this species and some of its relatives were examined in detail by Wells *et al.* (2001). Choosing a broad genus *Trichastoma* as their preferred home for the species, they disagreed with Ripley & Beehler (1985a) about its proximity to *capistratum* and instead found it exceedingly close to *tickelli* but less closely related to *buettikoferi* (which others, e.g., Marle & Voous 1988, have treated as an actual race of *tickelli*). The 'taxonomy' notes in Collar & Robson (2007) did not signal this significant revision (although the reference is cited).

Collar & Robson (2007: 193) noted that Borneo is said to hold populations falling outside the usually cited ranges of the named forms, and that these need further attention.

Pellorneum buettikoferi (Vorderman, 1892):
Restricted to Sumatra. Wells *et al.* (2001) have argued that this deserves the rank of a full species, but its closest relative is not yet clear. It does not appear to be a Sumatran allospecies of *pyrrogenys* and/or of *tickelli* and Dickinson (2003) removed it from its position in between these two species and provisionally placed it after them.

Pellorneum capistratum (Temminck, 1823):
From Tenasserim and the Thai-Malay Peninsula to Sumatra, Java and Borneo. Mees (1986) placed Sumatran *nyctilampis* Oberholser, 1922 in the synonymy of mainland *P. c. nigrocapitatum* (Eyton, 1839). Wells (2007: 344) reported a distinctive difference between calls in the north and south of the Thai-Malay Peninsula, one that merits a closer examination of this species.

Trichastoma rostratum Blyth, 1842:
The Thai-Malay Peninsula and Greater Sundas, but absent from Java. Deignan (1964: 252) listed three names as synonyms of the Bornean population, all used historically for this taxon, albeit incorrectly. The problem began when Salvadori (1874) took the name *Trichastoma umbratile* Strickland, 1849 and applied the derived combination *Brachypteryx umbratilis* to Bornean birds proving to be babblers of this species. Salvadori associated this name with Temminck (presumably due to Temminck's relationship to the Leiden collection where this MS name appeared on the mounts for some specimens). The other two names are *Aethostoma umbratile* Sharpe, 1903, a combination derived directly from Salvadori's usage (although associated clearly with Strickland) and *Aethostoma witmeri* Sharpe, 1903—proposed as a new name for *umbratile* which, at the last moment, Sharpe considered to have been preoccupied. In fact, Stone (1902) had shown that Strickland's type was not a babbler but a flycatcher of the genus *Rhinomyias* (see Vaurie 1952). All three of these names relate to the genus *Rhinomyias* and have no relevance to this group of babblers except as names used by mistake.

Trichastoma celebense Strickland, 1849:
Restricted to Sulawesi and outlying islands. Although not followed by Dickinson (2003), White in White & Bruce (1986: 325)

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placed *connectens* Mayr, 1938 and *sordidum* Stresemann, 1938, later renamed *improbatum* Deignan, 1964, within *rufofuscum* (Stresemann, 1931) on the grounds that he thought variation through Sulawesi to be clinal and that these two names, like *rufofuscum*, had been coined for populations along the cline. It has become more usual in such circumstances to name just the end points of the cline: here *celebense* and *finschi* Walden, 1876. However, the topography of this island does not lend itself to the idea that a single cline will explain the variation and although the view of White & Bruce was accepted by Collar & Robson (2007) it is not adopted here.

Dickinson (2003) resurrected the name *sordidum* Stresemann, 1938. Deignan's replacement, *improbatum*, had been proposed in 1964 when he sank genus *Malacocincla* into *Trichastoma* (rather than adopt the mistaken relationship, with priority not respected, used by Delacour 1946). Within his broad *Trichastoma*, the name first proposed as *Aethostoma celebense sordidum* was preoccupied by *Anuropsis malaccensis sordida* Chasen & Kloss, 1929.

Dickinson (2003) followed Ripley & Beehler (1985a) in retaining a separate genus *Malacocincla* (however marginal the difference from *Trichastoma*) and kept the species *malaccensis* in *Malacocincla*, thus these two names ceased to be congeneric. Governed by Art. 59.4[4] of the Code, the 1964 replacement then required reversing.

Readers referring to Deignan (1964: 254) will find a listing of *Turdinus castaneus* Büttikofer, 1893 as a synonym of nominate *celebense*. Following its examination by Mees (see Watson *et al*. 1986: 30 fn), however, the type of this name was identified as a bush warbler and placed in the broad genus *Bradypterus*.

Malacocincla abbotti Blyth, 1845:
Occurs from India to mainland Southeast Asia, Sumatra and Borneo; absent from Sri Lanka and Java.

Deignan (1964: 255) accepted *Trichastoma abbotti amabile* (Koelz, 1952) although Ripley (1961: 348) placed this name in the synonymy of nominate *abbotti*. Ripley (1982: 322) maintained this rejection of *amabile* and Dickinson (2003) followed him. Rasmussen & Anderton (2005) also rejected *amabile*.

A new form, *krishnarajui*, described from the Eastern Ghats by Ripley & Beehler (1985b) was treated as distinct by both Dickinson (2003) and Rasmussen & Anderton (2005).

The naming of the population of Borneo and Belitung island has been a matter of controversy. The name *buettikoferi* Finsch, 1901 was in use for many years, but when Delacour (1946) united in *Malacocincla* 17 species that had previously been partitioned between that genus and *Aethostoma* the name *buettikoferi* Vorderman, 1892, then attached to species *pyrrhogenys* [sic] as, e.g., by Chasen (1935), forced Finsch's name into synonymy as preoccupied.

Delacour (1947: 249) replaced *buettikoferi* Finsch, 1901 with the name *'finschi'* but if he ever formally proposed this as a *nomen novum* we have not found it and nor, it seems, did Deignan (1964). In any event, the name *finschi* would have been unavailable as it was already in use for a form of the species *celebense*, having been proposed by Walden (1876). Delacour (1947) used the name *sirensis* Oberholser, 1917 for birds of Mata Siri Island, and when Deignan (1964) revised the taxonomy of the group, and made clear that *Trichastoma* had three years priority over *Malacocincla*, he lumped this small insular population with the birds of Borneo and Belitung and used the name *sirensis* for them all. Next, Mees (1971) revealed two older synonyms and proposed that *concreta* Büttikofer, 1895[5] be

[4] The Code distinguishes between secondary homonyms as follows: those rejected and replaced before 1961 are covered by Art. 59.3, those rejected after 1960 by Art. 59.4., and those that had not been rejected before the homonymy ceased to exist are covered by Art. 59.2.

[5] *Myiothera concreta* Bonaparte, 1850 is a *nomen nudum* and the basis for Büttikofer's listing of *Turdirostris concretus* Bonaparte. This does not exclude Büttikofer's name from use.

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brought into use as a substitute name. This has become accepted.

Delacour (1947) having 'rejected' (in the wording of the Code) the name *buettikoferi* Finsch and replaced it, even if he did not do so validly, causes Art. 59.3 of the Code to govern the question of whether Finsch's name can be restored. Dickinson (2003) placed species *pyrrogenys* in *Pellorneum* and *abbotti* in *Malacocincla* so that the two are not congeneric (and neither Delacour's improperly introduced and unavailable replacement name nor the name from synonymy used by Deignan is in use). However, these genera and *Trichastoma* appear to be so nearly allied, and Wells *et al.* (2001) had both the relevant species in *Trichastoma* (as did Wells 2007), that we consider the substitute name *concreta* to be in use by some taxonomists and take the view that for that reason no change should be made.

Malacocincla sepiaria (Horsfield, 1821):
Range includes the Thai-Malay Peninsula and Greater Sunda Islands.

The main taxonomic change since Deignan (1964) has been the placement of Sumatran *vanderbilti* Meyer de Schauensee & Ripley, 1940 within this species, together with *liberalis* Chasen, 1941, in the synonymy of subspecies *barussana* Robinson & Kloss, 1921. Having examined the type specimen of *vanderbilti*, Hoogerwerf (1966) suspected that it was an immature of *sepiaria* and not, as had been supposed, related to species *perspicillata* (see on). Mees (1995), having observed that Hoogerwerf's paper had been overlooked, re-stated this position adding that he had examined these specimens with Hoogerwerf and agreed with his findings.

A lesser point relates to the presence or absence of this species on Bangka island. Deignan (1964) completely omitted mention of *Malacocincla sepiaria bangkae* Meyer de Schauensee, 1958. Mees (1986) discussed this, not within his synoptic list for Bangka, but in the preliminary pages. There he revealed that some or all of Kannegieter's specimens, which Meyer de Schauensee had believed to have been from Bangka, had labels marked 'Omstreken, Batavia' implying that they came from the surroundings of what is now Jakarta in Java. Frank Gill examined the type for Mees and offered the opinion that it was very close to Javan *sepiaria*. A more recent opinion requested from Nate Rice was more qualified. Regardless, Mees's case is strong and he was justified in removing this species from the Bangka list.

Malacocincla perspicillata (Bonaparte, 1850):
Known solely from the type, believed to have come from Borneo. Hoogerwerf (1966) made clear that this is a very distinct species but his paper was quickly forgotten. Mees (1995) rightly revisited the issue, stating his agreement with Hoogerwerf, providing photographs of the type and explaining why it fits only moderately well in genus *Malacocincla*, having some characters more typical of *Malacopteron* including a tarsus/wing ratio of only '29.5%' (Mees, 1995: 65). In Mees's opinion, any search for this species to determine whether it survives and is not, perhaps, an intergeneric hybrid needs to be focused in the lowlands of the Martapura and Banjarmasin area of south Borneo (Kalimantan Selatan province). This may not have taken modern deforestation into account, and see Collar & Robson (2007: 199) for a more specific suggestion of a place to search.

Inskipp *et al.* (1996) suggested that the unique type may not have come from Borneo. This remains possible but is not more than historical speculation.

Malacocincla malaccensis (Hartlaub, 1844):
The Thai-Malay Peninsula to Sumatra and Borneo; absent from Java.

Over time, views on the attribution of names to the Bornean populations of this bird have varied. Deignan (1964: 251) listed *saturata* Robinson & Kloss, 1920 from western

[6] Presumably, these were collected between 1846 and 1848 (see Fransen *et al.* 1997: 294).
[7] Boie was in the East Indies in the mid 1820s (see Fransen *et al.* 1997: 215).

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Borneo and *poliogenis* Strickland, 1849 from eastern Borneo. This treatment reflected that of Oberholser (1932) and Chasen (1935). Earlier, Kloss (1931) had had *saturata* in the synonymy of *poliogenis*.

Robinson & Kloss (1920) apparently believed that the name *poliogenis* derived from Sumatra, perhaps because Büttikofer (1895: 84) had referred to a Müller MS name *Myiothera poliogenis* on two old specimens from Sumatra in addition to two from the Karau River in Borneo which he said had been collected by Schwaner[6]. Why Robinson & Kloss believed Sumatra to be correct when Strickland's original description referred solely to Borneo, however, is unclear. Strickland (1849) wrote "obtained by Mr Wilson from M. Verreaux, with the words '*Myiothera poliogenys*, Boie, Borneo' attached"[7]. So, a distinction must be made between Strickland's *poliogenis* with the type locality given just as Borneo, specimens in Leiden seen by Büttikofer, including some labelled *Myiothera poliogenis* by Müller which may or may not have had the same provenance as Strickland's type, and specimens collected by Schwaner from the Karau River which were not associated with Strickland's name.

Edward Wilson was purchasing for the Academy of Natural Sciences, Philadelphia and it is known that he agreed that Jardine and Strickland might describe novelties in Jardine's 'Contributions' (Stone 1899).

In 1930, Chasen & Kloss mis-read Büttikofer 1895, p. 84, in treating Schwaner's birds from the Karau River, a left-bank tributary of the Barito, southeastern Borneo, as topotypes of Strickland's *poliogenis*, whereas Strickland's type is, in fact, associated only with Boie, not at all with Schwaner. In this paper, they also linked Karau river birds with the dull-coloured population of 'North Borneo' recently named by them *Anuropsis malaccensis sordidus* (*sordida* in feminine *Malacocincla*), distinct from their brighter bird *saturata* of Baram, north Sarawak (Chasen & Kloss 1929). They thereby laid the ground for the assumed existence of a dull-coloured population common to the whole of eastern Borneo.

Calling birds from the Karau River 'pseudo-types' because they were inappropriate substitutes for the Strickland holotype, Mees (1986) reported that birds from the Kayan River, further north in eastern Borneo, were slightly duller than true *poliogene* [sic] but were not the still duller population of North Borneo. He did not tell us what material he had that matched the holotype although he must have considered Müller's specimens more likely to be representative than the later ones from Schwaner's collections. Even so, correctly in our view, he wrote that it is *saturata* rather than *sordida* that is a synonym of *poliogenis*. Mees considered *poliogene* to be distributed over most of Borneo outside the range of *sordida*, also on Belitung and Bangka Islands; thus he agreed with Kloss (1931).

The anomalous specimen from Sarawak named *feriatus* by Chasen & Kloss 1931 (now *feriata* in feminine *Malacocincla*) was listed by them as a possible component of the species. The latest word appears in Collar & Robson (2007: 200) where it is suggested that this name may have been attached to a juvenile of *poliogenis*.

Malacopteron affine (Blyth, 1842):
The Thai-Malay Peninsula, Sumatra and Borneo; absent from Java. Deignan (1964) recognised three geographical races, but Mees (1986) made the species monotypic, remarking that Deignan's material from Borneo must have contained 'a large proportion of immature birds' which are more rufous, especially along the edges of the flight feathers, and have less black on the crown. Dickinson (2003) accepted this, and so did Wells (2007). Collar & Robson (2007: 196) disagreed[8] and recognised *phoeniceum* Deignan, 1950 from Borneo. However, Mees

[8] In this context we were delighted to see a review by Collar (2006) providing a rationale for the major changes in taxonomy adopted by Collar & Robson (2007). There has been too much new taxonomy with inadequate explanatory discussion or detail in many recent field guides and handbooks. However, Collar (2006) did not treat the genus *Malacopteron* or include the proposed resurrection of *Ophrydornis*.

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found no difference between Sumatran and Bornean birds and since we believe he had had ample material to reach this judgement, in the absence of a more detailed and convincing review, we continue to consider this species monotypic.

Malacopteron albogulare (Blyth, 1844): Restricted to Peninsular Malaysia, Sumatra and Borneo. Although it is typically social, living at least in small family parties, this species may not actually be closely related to other *Malacopteron* species, indeed may not be a pellorneine or even a timaliid. Harington (1915), who accepted the monotypic genus *Ophrydornis* Büttikofer, 1895, considered eggs that he believed were of this species to signal just that. Wells (2007) stated that a unique voice recording from Malaysia is typical of *Malacopteron* but (pers. comm.) has since had doubts about the correctness of the field attribution. For lack of molecular data, nevertheless, we do not yet agree to adopt the name *Ophrydornis*.

Although a separately named Bornean population, *moultoni* (Robinson & Kloss, 1919), was accepted by Deignan (1964), Dickinson (2003) and Collar & Robson (2007), we are conscious of the fact that Voous (1950) recommended monotypic treatment.

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APPENDIX

Molecular taxonomic status of the 23 species treated

This paper treats taxonomic limits at and below species level, but no full agreement has yet been reached on the generic limits of babblers. Molecular genetic information of various kinds is of demonstrated value at that level but, as stated above, coverage of the pellorneine taxa dealt with here still has some way to go. The following is our understanding up to date of those for which some versus no DNA data of any kind are yet available:

***Leonardina*:** sampled—none (*woodi* [generic type species]).

***Pellorneum*:** sampled—*ruficeps* [generic type species] (Cibois 2003, Pasquet *et al.* 2006, Gelang *et al.* 2009); *tickelli* (Cibois 2003, Alström *et al.* 2005); *capistratum* (Moyle *et al.* 2009). Not sampled—*albiventre, palustre, fuscocapillus, pyrrogenys* and *buettikoferi.*

***Trichastoma*:** sampled—none (*rostratum* [generic type species], *celebense, bicolor*).

***Malacocincla*:** sampled—*abbotti* [generic type species] (Cibois 2003, Gelang *et al.* 2009); not sampled—*sepiaria, perspicillata, malaccensis, cinereiceps.*

***Malacopteron*:** sampled—*cinereum* (Cibois 2003); *magnirostre* (Moyle *et al.* 2009); not sampled—*affine, magnum* [generic type species], *palawanense, albogulare.*

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SYSTEMATIC NOTES ON ASIAN BIRDS: 70

Types of the Timaliidae: subfamily Pellorneinae, part 1

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ABSTRACT Type availability is tabulated for 159 names representing 23 Asian species of babblers believed to belong to subfamily Pellorneinae of the Timaliidae, a clade in total containing over 50 Asian species and some African ones. Of the 159 names covered no types were located for 16 (10.1%). The synonymy offered is otherwise presented as an essentially complete and accurate resource for the area covered.

KEY WORDS babbler, nomenclature, Pellorneinae, synonymy, Timaliidae, type.

INTRODUCTION

It has been our practice to base these lists on Peters's *Check-list of Birds of the World* and we deal here with a part of the section of babblers previously often referred to as tribe Pellorneini[1]: specifically those covered in pages 241–265 of volume 10 of the *Check-list* (Deignan 1964). Following its overall editorial plan, Deignan treated the babblers as then understood in several subfamilies: Orthonychinae, Timaliinae and Panurinae. No tribes or other subdivisions were signalled although he generally followed the species sequence arranged by Delacour (1946), who did include tribes. Recent molecular studies (see Cibois *et al.*, this issue) show evidence that the composition of the current subfamily includes genera wholly or in part not grouped with it by Deignan, and the revised composition of the pellorneine clade is now quite surprising. We deal here with rather less than half of that clade.

We follow the style and practice of the preceding articles in this series of lists. They are designed to provide readers, especially those in Asia, with a comprehensive reference to synonymy organised in relation to recognised taxa, and to inform researchers of where a type specimen for each name may be found. Beneath each 'recognised taxon' synonyms are listed in order of priority by date of publication. All original citations have been checked to source and every effort made to cite them accurately. Where dates used by Deignan (1964) have been found to be in error we use the corrected date and footnote our explanation. As before, we include *nomina nova*, but if obliged to mention a *nomen nudum* do so only in the comments following Table 1.

For a map of the region that decides which names we include because at least some part of the breeding range of the species is included, see the Editor's Foreword.

METHODOLOGY

Our approach in this series has aimed at the development of as full a synonymy as we could assemble. Original descriptions have been checked and we have consulted museum curatorial staff when we felt their holdings should include particular types not mentioned in their type catalogues or records. Sometimes we visited collections to assist in searches for

[1] Delacour (1946: 22) employed the term "Tribu des Pellorneini"; see also Pellorneinae as listed by Bock (1994).

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types that we believed that the institution should hold but which may never have been recognised as such. Our work over the last eight years has helped museums to discover almost 100 type specimens that they did not know they had, and we have 'spun off' a series of related short notes which has included some lectotypifications and neotypifications. We have also tried to share our gains in understanding matters of bibliography and nomenclature.

The first article in this series (Dekker *et al.* 2000) stated that one of our primary objectives was to fill gaps in knowledge by stimulating a supply of information from readers. Sadly, this implicit request went very largely without response. Of the many missing types of names listed, very few indeed were subsequently uncovered and reported to us. A second objective, better fulfilled, was to be able to report types lost or destroyed over time, and especially the losses due to World War II.

We have examined many of the types that we list here, but certainly not all of them, and we are indebted to the authors of the museum type catalogues in which they have been published. Nor do we here include the nature of a given type (e.g., syntype, holotype or lectotype) or where additional types of the same name may be found. Such details belong in type catalogues and we have deliberately not included them in our series because it is the responsibility of museums themselves to complete, publish and update these catalogues.

THE RECENT BIBLIOGRAPHICAL BACKGROUND

Delacour (1946: 22–23) listed four genera in his pellorneine tribe: *Pellorneum, Malacocincla, Ptyrticus* and *Malacopteron*. The last we retain here by tradition. The others have been subject to some molecular analysis, results of which support the integrity of this core group (with African *Illadopsis* included). As will be seen when we deal with the rest of the Pellorneinae the clade includes some genera from Delacour's pomatorhinine tribe (Delacour 1946, 23–24), although not *Pomatorhinus* itself, as well as others from other tribes.

Since 1964, there has been an enormous growth in field experience of Asian birds. Babblers have received a full share of attention, with new species and subspecies being discovered, and significant range extensions recorded. Much of this knowledge has flowed directly into field guides and checklists (King & Dickinson 1975, Inskipp & Inskipp 1991, Robson 2000, Grimmett *et al.* 1998, Kazmierzak & van Perlo 2000; Rasmussen & Anderton 2005). Few of the individuals accumulating this knowledge have had the time to involve themselves in publishing specimen-based revisions, and few of the reviews that appeared during the first six decades of last century have been complemented by fresh studies. Museum specimen holdings have not been much augmented and many geographical gaps in historical collecting still remain unfilled. In the meantime, original collections have continued to age and, inevitably, to deteriorate. In particular, many babbler species are prone to post-mortem colour change. As time passes detailed whole-specimen studies are being hindered by problems of assembling representative samples in good enough condition, sufficient numbers, and from enough locations, thus reducing the contribution that can be made to determining species limits. Fresh field exploration of areas of potential contact and of the interactions of apparently allopatric and parapatric congeners become ever more necessary.

Specimen-based studies that have looked at precisely the group we address here include one by Ripley & Beehler (1985) and another by Wells *et al.* (2001). More recently, and with substantial specimen work done in preparation (a) for a field guide, (b) for the species accounts of volume 12 of the *Handbook of Birds of the World* (del Hoyo *et al.* 2007), Rasmussen & Anderton (2005) and Collar (2006) reviewed many Asian babblers. Collar's work focused in particular on species limits, exploring opportunities for the recognition of allospecies by combining mensural data with a system of typological (morphological) scoring from extensive samples (although these often lumped up to six subspecies).

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A preliminary review of the Pellorneinae (Dickinson & Cibois, this issue pp. 6–18) takes account of these and other more narrowly focused studies dating from the period 1963–2008. In the table below we incorporate the arrangement of species and subspecies that that review suggests.

THE TYPES AND SYNONYMY

In Table 1 we use bold type for the names of recognised taxa, with larger type for species headings. Names not in bold type are names in synonymy. While all valid species-group names are introduced with generic names the latter are sometimes abbreviated and sometimes inferred from an earlier heading. In cases of the former we give the abbreviation and complete the generic name within square brackets; in cases of the latter the entire generic name appears in square brackets. A second generic placed in brackets sometimes appears in original descriptions; this we would now interpret as a subgeneric name but it was not always so. Primary homonyms need explanation. We include four such names here and we place the entire binomen within square brackets to signal that these names, associated with these authors, are permanently unavailable. Such names can have types (Dickinson 2007).

If the type specimen is the same as that of its prior namesake then the name is a primary objective synonym; in such a case '—' in column four signals that the type is the same. Two of these occur: *Alcippe magnirostris* Moore, 1855, and *Alcippe cantori* Moore, 1855. Both are due to inadvertent duplicated or parallel publication. If the basis for the name is a specimen that was not a type of the senior homonym then the name is a subjective primary homonym and the location of its type is given when known. The two cases are *Pellorneum palustre* Hume, 1872, and *Malacopteron magnum* Blyth, 1847. The first is due to contested first publication and the second to description in error.

A '?' in column 4 implies that we do not know where a type, if there was one, may be deposited, and thus do not know whether it is lost or otherwise. Numbers in the far right column relate to the comments that follow the table. There, we deal with matters regarding

Table 1. Species-group names in the babbler subfamily Pellorneinae, with author(s), date and whereabouts of type material

Name	Author	Date	Museum	No.
Leonardina woodi [2]				
Leonardia [sic] *woodi*	Mearns	1905a	USNM	
Pellorneum albiventre [3]				
Pellorneum a. ignotum				
Pellorneum ignotum	Hume	1877	BMNH	
Pellorneum a. albiventre				
Niornis albiventris	Godwin-Austen	1877a	BMNH	
Turdinus nagaënsis	Godwin-Austen	1877b	BMNH	
Pellorneum a. cinnamomeum				
Drymocataphus cinnamomeus	Rippon	1900	BMNH	
Drymocataphus albiventer vicinus	Riley	1940	USNM	
Pellorneum a. pusillum				
Drymocataphus pusillus	Delacour	1927	BMNH	1.

[2] Described in *Leonardia* which was simultaneously proposed as a new genus. This generic name proved to be preoccupied by a mollusc name from 1890 and Mearns (1905b) rapidly provided the substitute name *Leonardina*, but in 1905, not 1906 as given by Deignan (1964: 261).

[3] Three names attached to this species date from 1877. The name *albiventre* Godwin-Austen dates from April 19 and has priority over *ignotum* Hume in August and *nagaense* Godwin-Austen, here corrected for gender agreement, in December (Ticehurst 1939). Until 1939, the specific binomen *ignotum* was in general use.

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Table 1 (cont).

Name	Author	Date	Museum	No.
Pellorneum palustre				
Pellorneum palustre "Jerd."	Gould [4]	1872	?	
[*Pellorneum Palustre*]	Hume	1872	n/a	2.
Pellorneum ruficeps				
Pellorneum r. olivaceum				
P[*ellorneum*]. *olivaceum*?	Jerdon	1839	?	3.
Pellorneum ruficeps granti	Harington	1913	BMNH	
Pellorneum r. ruficeps				
Pellorneum ruficeps	Swainson in Swainson & Richardson	1832	?	4.
Megalurus ? *ruficeps*	Sykes	1832	?	5.
M[*otacilla*]. *Dumeticola*	Tickell	1833	?	6.
Pellorneum r. pallidum				
Pellorneum ruficeps pallidum	Abdulali	1982	BNHS	
Pellorneum r. punctatum				
Cinclidia punctata	Gould	1838	BMNH	
Pellorneum ruficeps jonesi	Stuart Baker	1920	BMNH	
Pellorneum r. mandellii				
Pellorneum Mandellii	Blanford	1871	?	7.
Pellorneum nipalense	Sharpe	1883	BMNH	8.
Pellorneum r. chamelum				
Pellorneum ruficeps chamelum	Deignan	1947	AMNH	
Pellorneum r. ripleyi				
Pellorneum ruficeps ripleyi	Deignan	1947	AMNH	
Pellorneum r. pectorale				
Pellorneum pectoralis [sic]	Godwin-Austen	1877c	BMNH	
Pellorneum r. vocale				
Pellorneum ruficeps vocale	Deignan	1951	YPM	
Pellorneum r. stageri				
Pellorneum ruficeps stageri	Deignan	1947	USNM	
Pellorneum r. shanense				
Pellorneum ruficeps shanense	Deignan	1947	AMNH	
Pellorneum r. hilarum				
Pellorneum ruficeps hilarum	Deignan	1947	MCZ	
Pellorneum r. victoriae				
Pellorneum ruficeps victoriae	Deignan	1947	AMNH	
Pellorneum r. minus				
Pellorneum minor [sic]	Hume	1873	BMNH	
Pellorneum intermedium	Sharpe	1883	BMNH	9.
Pellorneum r. subochraceum				
Pellorneum subochraceum	Swinhoe	1871	BMNH	
Pellorneum r. insularum				
Pellorneum ruficeps insularum	Deignan	1947	USNM	
Pellorneum r. acrum				
Pellorneum ruficeps acrum	Deignan	1947	USNM	
Pellorneum r. chthonium				
Pellorneum ruficeps chthonium	Deignan	1947	USNM	
Pellorneum r. indistinctum				
Pellorneum ruficeps indistinctum	Deignan	1947	USNM	
Pellorneum r. elbeli				
Pellorneum ruficeps elbeli	Deignan	1956	USNM	
Pellorneum r. dusiti				
Pellorneum ruficeps dusiti	Dickinson & Somtob Chaiyaphun	1970	USNM	
Pellorneum r. oreum				
Pellorneum ruficeps oreum	Deignan	1947	FMNH	
Pellorneum r. vividum				
Pellorneum nipalense vividum	La Touche	1921	MCZ	

[4] Gould's name dates from March 1872 while Hume's dates from November.

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Table 1 (cont).

Name	Author	Date	Museum	No.
Pellorneum r. ubonense				
Pellorneum ruficeps ubonense	Deignan	1947	ANSP	
Pellorneum r. deignani				
Pellorneum ruficeps deignani	Delacour	1951	USNM	
Pellorneum r. dilloni				
Pellorneum ruficeps dilloni	Delacour	1951	USNM	
Pellorneum r. euroum				
Pellorneum ruficeps euroum	Deignan	1947	USNM	
Pellorneum r. smithi				
Pellorneum smithi	Riley	1924	USNM	
Pellorneum fuscocapillus				
Pellorneum f. babaulti				
Scotocichla fuscicapilla babaulti	T. Wells	1919	BMNH	
Pellorneum f. fuscocapillus				
Dr[*ymocataphus*]. *fuscocapillus*	Blyth	1849	ZSI?	10.
Pellorneum fuscocapillum scortillum	Ripley	1946	USNM	
Pellorneum tickelli				
Pellorneum t. garoense				
Turdinus garoensis	Godwin-Austen	1874	BMNH	11.
Drymocataphus assamensis	Sharpe	1883	BMNH	12.
Brachypteryx cryptica	Ripley	1980	USNM	
Pellorneum t. grisescens				
Drymocataphus tickelli grisescens	Ticehurst	1932	BMNH	
Pellorneum t. fulvum				
Drymocataphus fulvus	Walden	1875	BMNH	
Drymocataphus tickelli olivaceus	Kinnear	1924	BMNH	
Drymocataphus tickelli ochraceus [5]	Kinnear	1934	BMNH	
Pellorneum t. annamense				
Drymocataphus tickelli annamensis	Delacour	1926	BMNH	
Pellorneum t. tickelli				
Pellornium [sic] *Tickelli*	Blyth	1859 [6]	ZSI?	13.
Trichastoma minor	Hume [7]	1874	BMNH	
Drymocataphus tickelli australis	Robinson & Kloss	1921	BMNH	
Pellorneum pyrrogenys [8]				
Pellorneum p. pyrrogenys				
Myiothera pyrrogenys	Temminck	1827	RMNH	
Aethostoma pyrrogenys besuki	Kloss	1931	BMNH	
Pellorneum p. erythrote				
Malacopterum erythrote	Sharpe	1883	BMNH	14.
Pellorneum p. longstaffi				
Malacocincla canicapillus longstaffi	Harrisson & Hartley	1934	BMNH	
Pellorneum p. canicapillus				
Turdinus canicapillus	Sharpe	1887	AMNH	
Pellorneum buettikoferi				
Trichostoma [sic] *büttikoferi*	Vorderman	1892	RMNH	

[5] Proposed as a new name for *Drymocataphus tickelli olivaceus* Kinnear, 1924, preoccupied in *Trichastoma* by *Malacopteron olivaceum* Strickland, 1847. Were Kinnear's name to be required it might now be possible to invoke Art. 59.2 of the Code and use it.

[6] This name may date from 1860 but we believe that proof of that has not yet been found.

[7] Preoccupied in *Pellorneum* by *Pellorneum minor* Hume, 1873 (see above).

[8] Not *pyrrhogenys*, an unjustified emendation by Gray (1846) also used by Sharpe (1883: 588).

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Table 1 (cont).

Name	Author	Date	Museum	No.
Pellorneum capistratum				
Pellorneum c. nigrocapitatum				
Brachypteryx nigrocapitata	Eyton	1839	BMNH	
Bessethera barbata	Cabanis	1851	MHH	15.
Turdirostris nigro-capistratus Verr. Mus.	Bonaparte	1854	?	16.
Drymocataphus nigrocapitatus nyctilampis	Oberholser	1922	USNM	
Pellorneum c. capistratoides				
Goldana capistratoides	Strickland	1849	ANSP	17.
Pellorneum c. morrelli				
Pellorneum capistratum morrelli	Chasen & Kloss	1929	BMNH	18.
Pellorneum c. capistratum				
Myiothera capistrata	Temminck	1823	RMNH	
Trichastoma rostratum				
Trichastoma r. rostratum				
Tr[*ichastoma*]. *Rostratum*	Blyth	1842	ZSI?	19.
Brachypteryx buxtoni	Tweeddale	1877	BMNH	
Ptilocichla leucogastra	Davison	1892	BMNH	
Aethostoma rostrata aethalea	Oberholser	1922	USNM	
Aethostoma rostrata paganica	Oberholser	1922	USNM	
Trichastoma r. macropterum				
Brachypteryx macroptera [9]	Salvadori	1868	Lost	20.
Trichastoma celebense				
Trichastoma c. celebense				
Trichostoma [sic] *celebense*	Strickland	1849	ANSP	
Trichastoma c. connectens				
Aethostoma celebense connectens	Mayr	1938	USNM	
Trichastoma c. rufofuscum				
Aethostoma celebense rufofuscum	Stresemann	1931	AMNH	
Trichastoma c. finschi				
Trichostoma [sic] *finschi*	Walden	1876	BMNH	
Trichastoma c. sordidum				
Aethostoma celebense sordidum	Stresemann	1938	ZMB	
Trichastoma celebense improbatum [10]	Deignan in Mayr & Paynter	1964	ZMB	
Trichastoma c. togianense				
Malacocincla celebensis togianensis	Voous	1952	ZMA	
Trichastoma bicolor				
Brachypteryx bicolor	Lesson	1839	?	21.
M[*alacopteron*]. *Ferruginosum*	Blyth	1844	?	22.
Napothera rubicauda "Müll. Mus. Lugd."	Bonaparte	1850	RMNH	
Erthrocichla bicolor whiteheadi	Hartert	1915	AMNH	
Erythrocichla bicolor bankana	Riley	1938	USNM	
Malacocincla abbotti				
Malacocincla a. abbotti				
M[*alacocincla*]. *Abbotti*	Blyth	1845	ZSI?	23.
Malacocincla abbotti rufescentior	Deignan	1948	USNM	
Malacocincla abbotti amabilis	Koelz	1952	UMMZ	
Malacocincla a. krishnarajui				
Malacocincla abbotti krishnarajui	Ripley & Beehler	1985	USNM	
Malacocincla a. williamsoni				
Malacocincla abbotti williamsoni	Deignan	1948	USNM	

[9] For comments on the three synonyms that were listed by Deignan (1964: 252) see Dickinson *et al.*, this issue, p. 11.

[10] A new name for *Aethostoma celebense sordidum* Stresemann, 1938, preoccupied in *Trichastoma* by *Anuropsis malaccensis sordida* Chasen & Kloss, 1929 = *Trichastoma malaccense poliogene* (Strickland), which is here treated in *Malacocincla*.

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Table 1 (cont).

Name	Author	Date	Museum	No.
Malacocincla a. altera				
Trichastoma abbotti alterum	Sims	1957	BMNH	
Malacocincla a. obscurior				
Malacocincla abbotti obscurior	Deignan	1948	USNM	
Malacocincla a. olivacea				
Malacopteron olivaceum	Strickland	1847	?	24.
Malacocincla a. concreta				
Malacocincla concreta Müll. MS	Büttikofer	1895	RMNH	25
Malacocincla Büttikoferi	Finsch	1901	RMNH	
Malacocincla abbotti sirensis	Oberholser	1917b	USNM	
Malacocincla abbotti eritora	Oberholser	1922	USNM	
Malacocincla abotti [sic] *voousi* [11]	Wynne	1955	RMNH	
Malacocincla a. baweana				
Malacocincla abbotti baweana	Oberholser	1917a	USNM	
Malacocincla sepiaria				
Malacocincla s. tardinata				
Malacocincla sepiaria tardinata	Hartert	1915	AMNH	
Malacocincla s. barussana				
Malacocincla sepiaria barussana	Robinson & Kloss	1921	BMNH	
Malacocincla vanderbilti	Meyer de Schauensee & Ripley	1940	ANSP	
Malacocincla sepiaria liberalis	Chasen	1941	RMNH	
Malacocincla s. sepiaria				
Brachypteryx sepiaria	Horsfield	1821	BMNH	
Turdinus sepiarius (Horsf.) var. *minor*	A. B. Meyer	1884	MTD	
Myiothera pyca "Boie"	Büttikofer	1895	RMNH	
Malacocincla sepiaria bangkae	Meyer de Schauensee	1958	ANSP	26.
Malacocincla s. rufiventris				
Malacocincla rufiventris [12]	Salvadori	1874	?	27.
Turdinus tephrops	Sharpe	1893	BMNH	
Elocincla aenigma	Riley	1939	USNM	
Malacocincla s. harterti				
Malacocincla sepiaria harterti	Chasen & Kloss	1929	BMNH	
Malacocincla perspicillata				
[*Cacopitta*] (*Myiothera*) *perspicillata* "Temm. Mus. Lugd."	Bonaparte	1850	RMNH	
Malacocincla malaccensis				
Malacocincla m. malaccensis				
B[*rachypteryx*]. *malaccensis*	Hartlaub	1844	?	28.
Anuropsis malaccensis nesitis	Oberholser	1912	USNM	
Anuropsis malaccensis exsanguis	Oberholser	1912	USNM	
Anuropsis malaccensis drymodrama	Oberholser	1922	USNM	
Anuropsis malaccensis driophila	Oberholser	1922	USNM	
Malacocincla m. poliogenis				
Brachypteryx poliogenis	Strickland	1849	ANSP	29.
Anuropsis malaccensis saturata	Robinson & Kloss	1920	BMNH	
Anuropsis malaccensis docima	Oberholser	1922	USNM	
Malacocincla m. sordida				
Anuropsis malaccensis sordidus [sic]	Chasen & Kloss	1929	?	30.
Malacocincla (m.) feriata				
Anuropsis malaccensis feriatus [sic]	Chasen & Kloss	1931	AMNH	

[11] A *nomen novum* for *Malacocincla buettikoferi* Finsch, 1901, preoccupied in *Trichastoma* by *Trichostoma* [sic] *buettikoferi* Vorderman, 1892.

[12] Delacour (1946) examined the type of *aenigma* and considered it identical with *rufiventris*.

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Table 1 (cont).

Name	Author	Date	Museum	No.
Malacocincla cinereiceps				
Drymocataphus cinereiceps	Tweeddale	1878	BMNH	
Malacopteron magnirostre				
Malacopteron m. magnirostre				
Alcippe magnirostris	Moore in Horsfield & Moore	1854	BMNH	
[*Alcippe magnirostris*]	F. Moore	1855	—	31.
Napothera mystacalis	Blyth	1865	RMNH	
Malacopteron magnirostris flavum	Chasen & Kloss	1928	BMNH	
Malacopteron m. cinereocapilla				
Alcippe cinereocapilla	Salvadori	1868	Lost	32.
Turdinus kalulongæ	Sharpe	1893	BMNH	33.
Malacopteron affine				
Tr[*ichastoma*]. *Affine*	Blyth	1842	ZSI?	34.
N[*apothera*]. *Atricapilla* (ex Müller MS)	Bonaparte	1850	RMNH	
Napothera rubicauda	Bonaparte	1850	RMNH	
Alcippe Cantori	Moore in Horsfield & Moore	1854	BMNH	
[*Alcippe Cantori*]	Moore	1854	—	35.
Malacopterum melanocephalum	Davison	1892	SZRC	
Malacopteron notatum	Richmond	1902	USNM	
Malacopteron affine phoeniceum	Deignan	1950	USNM	
Malacopteron cinereum				
Malacopteron c. indochinense				
Horizillas rufifrons indochinensis	Robinson & Kloss	1921	BMNH	
Malacopteron c. rufifrons				
M[*alacopteron*]. *rufifrons*	Cabanis	1851	ZMB	
Malacopterum lepidocephalum 'Gray'	Sharpe	1883	?	36.
Malacopteron c. cinereum				
Malacopteron cinereus [sic]	Eyton	1839	?	37.
[*Malacopteron magnum* 'Eyton'] [13]	Blyth	1847	ZSI?	38.
Napothera coronata "Müll. MS in Mus. Lugd."	Bonaparte	1850	RMNH	
Timalia ruficapilla	Pucheran in Jacquenot & Pucheran	1853	MNHN	
Timalia squamifrons	Bonaparte	1854	?	39.
Malacopterum cinereum bungurense	Hartert	1894	AMNH	
Malacopteron c. niasense				
Malacornis cinerea niasensis	Riley	1937	USNM	
Malacopteron magnum				
Malacopteron m. magnum				
Malacopteron magnum	Eyton	1839	BMNH	
Malacopteron majus	Blyth	1847	ZSI?	40.
N[*apothera*]. *Pileata* "Müll. Mus. Lugd."	Bonaparte	1850	RMNH	
Malacopteron m. saba				
Malacopteron magnum saba	Chasen & Kloss	1930	BMNH	
Malacopteron palawanense				
Trichastoma rufifrons	Tweeddale	1878	BMNH	
Malacopteron palawanense [14]	Büttikofer	1895	BMNH	

[13] A primary homonym.

[14] A replacement name for *Trichastoma rufifrons* Tweeddale, 1878, preoccupied in *Malacopteron* by *Malacopteron rufifrons* Cabanis, 1851, from Java or Sumatra—indeterminate, not necessarily a babbler. See Cabanis (1851: 65 footnote).

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Table 1 (cont).

Name	Author	Date	Museum	No.
Malacopteron albogulare				
Malacopteron a. albogulare				
S[*etaria*]. *Albogularis*	Blyth	1844	ZSI	41.
Ophrydornis albogularis moultoni	Robinson & Kloss	1919	BMNH	
Setaria albigularis [sic] *leucogastra*	Hachisuka	1926	BMNH	

those types that we have not located, and similar issues.

Corrections to names and dates, and information relating to nomenclature rather than to the types themselves are to be found in our footnotes. The series policy has been that *nomina nuda* (names lacking the necessary grounding in a description, depiction or 'indication') were normally dealt with in footnotes, but we now prefer that they be mentioned within the comments.

COMMENTS ON TABLE 1

1. *pusillum*: Delacour (1927) stated that his holotype was in Paris but it was correctly listed for the BMNH by Warren & Harrison (1971: 454); see also Hennache & Dickinson (2000).
2. *palustre* Gould: the type locality given was 'Cachar, Assam' and Gould (1872) said that Jerdon had lent him the specimen. Hume (1872) wrote that, although Gould had published the name and an illustration, the specimen upon which Jerdon's MS name was based was in his, i.e., Hume's, collection and he gave the origin as the Khasi Hills. Jerdon (1872: 300) said that he found this at 'Cherapoonjee' but also referred to collection in the Khasi Hills by Godwin-Austen. Hume was quite clear that he held Jerdon's original specimen, so whatever Gould had may have come from another locality and may or may not have been supplied by Jerdon. Regardless, two names were introduced with different type localities and, due to priority, Hume's is, of course, a primary homonym and unavailable. The type listed by Warren & Harrison (1971: 416) is, as they stated, Hume's specimen. However, they applied Gould's type locality to this, choosing to believe that Gould returned the type to Jerdon (and by implication that Jerdon then returned it to Hume; not, we think, a believable chain of events). The original accounts however make clear that there must have been two specimens rather than just the one that Gould supposedly returned. Hence the BMNH has the holotype of the unavailable primary homonym while the whereabouts of the holotype of Gould's name is unknown, like much other material once in Gould's hands.
3. *olivaceum*: Jerdon's type material is mostly no longer extant. As previously reported in this series, in his early years in India Jerdon probably never identified types as such and was extremely careless of his material so that initial despatches of specimens to Jardine were not in a fit state to be preserved. Later, the BMNH received certain specimens from Jerdon (Sharpe 1906: 403). Some of these have been considered types despite the fact that Jerdon did not so label them and may well have sent his earlier specimens to Jardine in Scotland or to Blyth in Calcutta. The available evidence in each case needs to be considered. In this instance, Sharpe (1883: 521) listed a specimen of *Pellorneum ruficeps* originating from Jerdon as from 'Madras', but did not suggest that this was a type.
4. *ruficeps*: Swainson wrote 'Type Mus. Nost.'. Benson (1999: 17) wrote that 'according to UMZC records, Swainson's collection of birds was purchased (probably in 1840) by subscription for a sum of £320, and presented to the University' but added 'it is virtually certain that a substantial

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proportion of Swainson type material is lost for good'. Benson made no entry in respect of *Pellorneum ruficeps*, and nor did Sharpe (1883: 521) or Warren & Harrison (1971).

5. *ruficeps* Sykes: Sykes described this in Latin, which he would not normally have done had he known the bird to have been described earlier, so his name has generally been considered to be a newly coined secondary homonym of Swainson's name. However, Sykes's specimen may not have been this species for he wrote "frequents the plains only, like a lark" which would certainly not fit this babbler. Such types as still exist from Sykes's collection reached the BMNH from the Indian Museum, to which Sykes had presented his collection in 1831 (Horsfield & Moore 1854: iv). Sharpe (1883: 521) listed a Sykes specimen from '? Mahabaleshwur hills' but did not claim this to be a type of Sykes's name. This specimen has not been traced.
6. *dumeticola*: Tickell's collection went to the Zoological Society of London, and the Society's collection was sold between 1854 and 1858 (any records kept of the disposals, and there may have been none, would have perished due to bomb damage in World War II). A few known types were obtained by the BMNH, but none bearing this name.
7. *mandellii*: although the types of other taxa described by Blanford in the same article are in the BMNH, the relevant section [1874.10.21] of the 1874 accession register listing those omits a specimen with this name. A search at Tring has not revealed any specimen that would qualify as a good candidate.
8. *nipalense*: Warren & Harrison (1971) appear to have been unaware that Sharpe's use of and provision of a description for the Hodgson name, up till then a *nomen nudum*, made the name available and attributable to Sharpe (1883: 518–519), who indicated two specimens he considered to be types.
9. *intermedium*: Sharpe (1883): listed two specimens in the BMNH, both from Dilkooska in the Duars. Deignan (1947: 11) noted the inclusion of Thayetmyo, S Burma, in the original range statement, where it was associated with the Wardlaw Ramsay collection. He suggested that the plate 'appears to have been taken from one of Ramsay's southern birds' but added that Dilkhushka [sic] birds 'cannot possibly be identical with that of Thayetmyo' and his restriction of the type locality was designed to 'remove the name from all further consideration'. It would be desirable for the BMNH type catalogue to include reference to this restriction, to Wardlaw Ramsay's specimens, and to Deignan's intent.
10. *fuscocapillus*: Sclater (1892) reported that two types were extant in the Indian Museum in Calcutta, so we know these were received from the museum of the Asiatic Society of Bengal. Finn (1901) listed them. If still extant they should be in the holdings of the Zoological Survey of India (ZSI). These holdings are rumoured to have been severely impaired due to flood damage and other losses, but during the nine years of the present series no response has been received from this institution on any question to do with types thought to be in its care.
11. *garoensis* [= *-ense*]: as far as we are able to tell this name has been at risk of becoming a *nomen oblitum*. We have found no use of it as the valid name for a 'particular taxon' since 1899 but we do not believe that 25 or more works have treated subspecies of Indian birds over the last 50 years and thus do not consider that the two conditions of Art. 23.9.1 of the Code (ICZN 1999) have been met. There is little doubt that the name should have been used; it is an older name than *assamense* and the type locality falls within the range ascribed to that form by Ripley (1982: 322 under the name *Trichastoma tickelli assamensis*). In the preceding paper (this issue), Dickinson & Cibois brought it into use and explained why.
12. *assamensis*: Deignan (1964: 248) gave the type locality as 'Dikrang valley, Dhollah, north eastern Assam'. This is a combination of two localities. Sharpe's detailed description was of a specimen from the Dikrang valley then still in the collection of Godwin-Austen

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(but since acquired by the BMNH). Dhollah is the listed locality for the one syntype that the BMNH held when Sharpe wrote.

13. *tickelli*: Blyth did not usually identify his type specimens and there is evidence relating to some of his names that he replaced a poor quality specimen used for a description with a later, finer specimen, even if sometimes from a different locality. Sclater (1892: 76) suggested that there were two types and Finn (1901) offered Calcutta 18946 and 18947 as their numbers. However, Tickell (1859: 449) listed just a single male, although he may well have obtained others later. We do not know if the type or types are extant.
14. *erythrote*: Sharpe (1883: 568) listed the type as 'purchased' and as from Borneo although its origins were debated early last century when Java was seen as a possible origin. Eventually, Chasen (1935: 212 footnote) concluded that some montane birds from western Sarawak were sufficiently close to the type of *erythrote* to justify acceptance of Borneo as its origin, and implicitly restricted the type locality to western Sarawak.
15. *barbata*: although no type at Halberstadt was listed by Quaisser & Nicolai (2006) three relevant specimens have now been located (B. Nicolai *per* R. van den Elzen, 9 March 2009).
16. *nigrocapistratus*: based on a specimen said to be from 'Malacca' (as were the specimens of *barbata*), this name originated as a Verreaux MS name but we have found no indication of where any underlying type material might be found.
17. *capistratoides*: Stone (1899: 47) stated that Edward Wilson lent specimens intended for Philadelphia to Jardine and Strickland, and gave permission for them to describe novelties in Jardine's *Contributions to Ornithology*. Three Bornean specimens of this species in the Academy of Natural Sciences, Philadelphia (ANSP) bear register numbers relating to that period and at least one is definitely a type. The label of this individual, now ANSP 17381, carries an annotation by Strickland indicating that this was the bird 'figured' in 'Contrib. Orn. 1849', and indeed Strickland described it therein, citing 'Verreaux MS' for the name *Myiothera capistratoides* 'Temm.'. Apparently, Wilson had purchased duplicate material that had been supplied to Verreaux by Temminck. For Temminck's other specimens, Bonaparte (1854) used the name *Turdirostris capistratoides* ['ex Temm.']. Bonaparte treated this name as a new combination and Dekker (2003) correctly omitted it from the Leiden type catalogue.
18. *morelli*: type locality Kudat, North Borneo, not Kadat as spelled by Warren & Harrison (1971: 365).
19. *rostratum*: the holotype was reported to be in the Indian Museum by Sclater (1892) and by Finn (1901), and should still be in Calcutta.
20. *macroptera* [*-um*]: Passerin d'Entrèves *et al.* (1986: pl. 4 and p. 156) reported in some detail on the loss of the type of *Pitta Bertae*, and in their note 38 on page 167 they mentioned *Brachypteryx macroptera* as one of the type specimens that Salvadori despatched to London via Paris, intended for Lord Walden, but which never reached Paris.
21. *bicolor*: we have no information regarding Lesson's type material. Few French specimens from his time were well enough preserved to have survived.
22. *ferruginosum*: Blyth said the origin was 'probably' Singapore, but without mentioning a donor. Although published in 1844 this account was likely written earlier. In 1844 Blyth received specimens from Malacca, presented by Revd. Lindstedt, and these are mentioned in Blyth (1852). When Sclater (1892) reported on types in the Indian Museum he did not list Lindstedt's specimens, nor did he mention types or the absence of types of this name. Most probably, Blyth discarded his original specimen when he received better ones from Lindstedt or someone else.
23. *abbotti*: Sclater (1892: 76) listed three types which match Blyth's original information. These may still exist at the ZSI, Calcutta.

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24. *olivaceum* [*-cea*]: Benson (1999: 16, 120) discussed Strickland's collection and a specimen of this in the BMNH that he felt had a claim to be the type, but did not argue its case strongly. Substantiation has not so far been possible.
25. *concreta*: Mees (1971: 238) designated a lectotype but Dekker (2003: 55) concluded that this designation was invalid because Büttikofer had used the term 'the type' for one of his specimens, thus establishing a holotype. As we understand it, moreover, the proposed lectotype was not one of the original syntypes related to Müller's name. Recognition of the original type and disavowal of the proposed lectotype should have no consequences for taxonomy.
26. *bangkae*: Mees (1986) thought the species absent from Bangka, suggested an alternative Javan origin for the type, and had it examined by Frank Gill who found the specimen to be consistent with Javan birds. Recently, Nate Rice kindly re-examined the specimen on our behalf. There is, in fact, very little material from Java at the ANSP and Rice was unable to do more than observe that a difference was perceptible and that this did not seem to be due to foxing as specimens compared were from the same collector and period. Until more evidence has been gathered, however, the opinion of Mees (1986) should be respected.
27. *rufiventris*: while *Pitta bertae* and *Brachypteryx macroptera* were described in a paper from the Turin museum, from a collection involving Doria and Beccari, this taxon was described in the Genoese journal. However, Arbocco *et al.* (1978) listed no type. Two specimens were collected by Beccari: field nos. 565 of 17 June 1866 and 724 of 2 November 1866. We have discussed and agreed with Enrico Borgi of the museum in Genoa that these may well have been included in the 69 birds, including *Pitta bertae* and *Brachypteryx macroptera*, sent to London via Paris and lost, but they were not explicitly listed by Passerin d'Entrèves *et al.* (1986: 167).
28. *malaccensis*: we enquired whether Hartlaub's type might be in Bremen (UMB), but it is not and we have no other leads to pursue.
29. *poliogene* [*-genis*]: Strickland's original description, published in quotation marks, implies a single specimen. We thus consider the Strickland specimen now in Philadelphia (ANSP) to be that collected by Boie, acquired from Verreaux for the ANSP by Edward Wilson but lent for description to Strickland, who mentioned both Wilson and Verreaux. It will almost certainly have originally been in the Leiden collection.
30. *sordidus*: Gibson-Hill (1948, 1949) reported on types from the Raffles Museum that were believed lost after World War II. The type of this species was listed among these. Most have subsequently been found, but not this one. ECD searched for it at Tring on 13 August 1997, again without success. A fresh search has also been made in Singapore by Wang Luan Keng, also without success.
31. *magnirostris* [*-tre*]: the original description was submitted for publication to the *Proceedings of the Zoological Society of London*, where the name and description duly appeared in May 1855. However, the catalogue of Horsfield & Moore appeared in 1854. Its type setting shows space left for the last-minute addition of a page number from the PZS, but this was never added. The 1855 name is identical and must be seen as a subsequent use; it is added here to prevent misunderstanding. See also Dickinson (2004).
32. *cinereocapilla*: Passerin d'Entrèves *et al.* (1986: 167) included this in their list of types known to have been lost in the parcel despatched to Paris intended to go on to Lord Walden in London.
33. *kalulongae*: Dickinson (2000) noted that the 'holotype' listed by Warren & Harrison (1971: 278) is in fact a lectotype and that there is a paralectotype in New York (AMNH) (see also LeCroy 2005: 69).
34. *affine*: Sclater (1892) and Finn (1901) reported Blyth's holotype as held by the Indian Museum and it may still be in Calcutta.

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35. *cantori*: as with *magnirostris* (above), dual publication occurred and the name in the later of the two publications, although a primary homonym due to differing authorship and intentional description, is just a subsequent use. See also Dickinson (2004).
36. *lepidocephalum*: Sharpe (1883: 567) listed prior usage of this name by Gray (1869: 318) and Blyth (1870). In Blyth (1870: 170) the name *Napothera lepidocephala* is a *nomen nudum*. Under the subgeneric name *Napothera*, Gray listed *lepidocephala* Homb. & J. from Sumatra, this being treated as a synonym of *Macronus* (*Napothera*) *ruficapillus* Pucheran. As Hombron & Jacquinot do not seem to have given a description, however, there is no preoccupation from this source. Gray also listed *lepidocephalus* Müll. which he saw as a different taxon ('No. 4767') and not as a synonym, this being from Java and Sumatra, but as he gave no description, again, the name is a *nomen nudum*. Sharpe listed just this latter usage by Gray, and as Müller's was only a manuscript name Sharpe's action in bringing the name *lepidocephalum* into use, with a description, credits him with authorship (see Deignan 1964: 264). This name is in the synonymy of Sumatran birds due to the restriction of type locality by Büttikofer (1895: 104). However, if the three specimens listed by Sharpe (1993) are all accepted as his types the series is composite and the East Javan bird collected by Wallace should be designated as the lectotype. Warren & Harrison (1971) did not list this name and the situation has not yet been discussed with the authorities at Tring, but once the agreed types have been located lectotypification should follow.
37. *cinereum*: Sharpe (1906: 349) reported that on Eyton's death his collection was bought by the dealer Gerrard, and that most of the types had then been bought for the BMNH. However, as Warren & Harrison (1971) did not list it, the BMNH appears not to have obtained this one.
38. *magnum*: Having none of Eyton's specimens Blyth apparently misunderstood Eyton's descriptions and is the inadvertent author of this homonym. He used the name *magnum*, attributing it to Eyton but was actually dealing with a specimen of *cinereum* (Sharpe, 1883: 565). That specimen, probably a holotype, may survive at ZSI, Calcutta.
39. *squamifrons*: based on Gray (1869), we treat this as a name given to a Sumatran bird. We have no information on a type but would expect it to have been in Paris. Bonaparte attached his description to a name he attributed to Pucheran in Hombron & Jacquinot, but we could not find this.
40. *majus*: while describing one or more specimens of *cinereum* as *magnum*, with specimens of true *magnum* before him but not known by him to be this form, Blyth (1847) thought them different and named them *majus*. See Sharpe (1883: 564) and Chasen (1935: 214).
41. *albogularis*: the holotype was noted by Sclater (1892) and by Finn (1901) and if still extant should be with ZSI, Calcutta.

SUMMARY OF TYPES NOT FOUND

The list below does not include names of taxa of which the types are definitely known to have been lost, or those believed likely to be held by the ZSI in Calcutta. The sequence is that of our Table 1 (above).

Pellorneum palustre Gould, 1872; *Pellorneum olivaceum*? Jerdon, 1839; *Pellorneum ruficeps* Swainson,1832; *Megalurus* ? *ruficeps* Sykes, 1832; *Motacilla Dumeticola* Tickell, 1833; *Pellorneum Mandellii* Blanford, 1871; *Turdirostris nigro-capistratus* Bonaparte, 1854; *Brachypteryx bicolor* Lesson, 1839; *Malacopteron ferruginosum* Blyth, 1844; *Malacopteron olivaceum* Strickland, 1847; *Malacocincla rufiventris* Salvadori, 1874; *B*[*rachypteryx*]. *malaccensis* Hartlaub, 1844; *Anuropsis malaccensis sordidus* Chasen & Kloss, 1929; *Malacopterum lepidocephalum* Sharpe, 1883; *Malacopteron cinereus* Eyton, 1839; *Timalia squamifrons* Bonaparte, 1854.

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Once again, we appeal for any information on the whereabouts of accepted or suspected type material relevant to any of these names.

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ACRONYMS

AMNH	American Museum of Natural History, New York.
ANSP	Academy of Natural Sciences, Philadelphia.
BMNH	The Natural History Museum (formerly the British Museum (Natural History)), Tring.
BNHS	Bombay Natural History Society, Mumbai.
FMNH	Field Museum of Natural History, Chicago.
MCZ	Museum of Comparative Zoology, Harvard.
MHH	Museum Heineanum, Halberstadt.
MNHN	Museum National d'Histoire Naturelle, Paris.
MNSG	Museo Civico di Storia Naturale di Genova, Genoa.
MTD	Senckenberg Naturhistorische Sammlungen (formerly Staatliche Naturhistorische Sammlungen Dresden), Museum für Tierkunde, Dresden.
RMNH	Nationaal Natuurhistorisch Museum (formerly Rijksmuseum van Natuurlijke Historie), Leiden.
SZRC	Zoological Reference Collection, Raffles Museum of Biodiversity Research, Singapore.
UMB	Überseemuseum, Bremen.
UMMZ	University of Michigan Museum of Zoology, Ann Arbor.
UMZC	University Museum of Zoology, Cambridge.
USNM	United States National Museum, Washington, D.C.
YPM	Peabody Museum of Natural History, Yale University, New Haven, Connecticut.
ZMA	Zoological Museum of the University of Amsterdam.
ZMB	Institut für systematische Zoologie, Museum für Naturkunde der Humboldt-Universität zu Berlin (formerly Zoologisches Museum, Berlin).
ZSI	Zoological Survey of India, Calcutta.

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SYSTEMATIC NOTES ON ASIAN BIRDS: 71

The status of *Macronus gularis connectens* (Kloss, 1918)

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ABSTRACT A name given in 1918 to the mid Thai-Malay Peninsula population of a highly polytypic species of tit babbler had just a generalised type locality and no stated holotype or syntypes. Because other populations that are close neighbours have been given names since then, without properly clarifying the status of the 1918 name, we here examine how best this situation can be resolved, and we announce our intention to seek approval of a neotypification.

KEY WORDS babbler, first reviser, lectotype, *Macronus gularis*, neotype, nomenclature, type locality.

INTRODUCTION

No type specimen was mentioned when Kloss (1918) described a new timaliid under the name *Mixornis gularis connectens* (pp. 80, 207), or *connecteus* (p. 207); nor did Kloss detail a formal type series. He did supply the wing and bill-from-gape measurements of three birds of each sex, but gave no collecting localities, dates of collection or museum registration details for any of these specimens. Kloss wrote "Typical birds come from about Lat. 10° N" which must be considered as the type locality. No-one since has proposed a solution to this lack of a type, or clearly restricted the relatively vague type locality. These two concerns are addressed below, and the resolution of related spelling issues is also reported.

THE NEED FOR A TYPE SPECIMEN

Where no type was specified in the original description a lectotype may be designated from among the specimens listed with the description (Art. 74, ICZN 1999, hereafter 'the Code'). In this instance, however, it has been necessary to examine the possibility of actually identifying Kloss's type series.

The geographical range that Kloss outlined for his new subspecies was considerable. He wrote: 'I have examined about a hundred examples [of the species] ranging from northern Siam to western Sumatra, and I find that birds occurring at Mergui, Bangkok, Cape Liant [SE Gulf of Bangkok], and down the Malay Peninsula differ from *M. r. rubricapilla* [sic], as noted in 'Stray Feathers', in having the black stripes heavier and produced further down the breast, a longer more robust bill, a deeper rufous crown, a rather narrower yellow supercilium, and rather darker back; they are separable at a glance from *M. r. sulphurea* with its pale "Sudan brown" crown, olivaceous upperparts, and bright yellow underparts where the mere shaft-stripes are confined to throat and fore-breast. They extend about as far south as Penang and Singgora, and to the islands adjacent, chief of which are the Bandon Group, Terutau and the Lang Kawis—as with several mammals and other birds, northern forms range further down the west coast of the Malay Peninsula than down the east, and southern forms further up the east than the west coast. Typical birds come from about Lat. 10° N.'

In summary, this range extended from just south of 14°N (Bangkok is at 13° 45′ N) to just above 7° N on the east coast (Singgora, now Songkhla, is at 07° 12′ N) and to nearer 5° N on the west coast. Kloss does not tell us how many of his assembled specimens had been collected within this area but they certainly included birds from both north and south of it. Those that he examined would have included specimens he and others had collected for the Selangor Museum, at least

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some of eighteen others lent to him by W.J.F. Williamson (see Kloss 1918: 205), and very probably further material collected by E.G. Herbert (see Robinson & Kloss 1921: 3) some of whose specimens had been collected in the central Thai-Malay Peninsula before *connectens* was described. From the lack of any special notation on the labels of Kloss, Williamson and Herbert specimens in the Natural History Museum, Tring, however, we have come to believe that Kloss never did formally establish a type series. Making a choice from not more than a subset of probable types is therefore undesirably limiting, even if a specimen were to be chosen from close to Kloss's indicative type locality. We have thus considered the possibility of designating a neotype, for which Art. 75.2 of the Code requires an adequate justification.

The identity of specimens found in the Malay Peninsula has recently been discussed by Wells (2007: 336). He wrote: 'Oberholser (1922) described far-NW (Mergui archipelago) island birds as subspecies *archipelagicus* (TL Domel Island, Tenasserim), claimed by him to average larger, paler and greyer, with narrower throat-streaks, than neighbouring mainland *connectens* Kloss, 1918 (TL the Peninsula at about 10° N). Others (e.g., Riley 1938) rejected this position and treated *archipelagicus* as a synonym of *connectens*. The latter occurs south at least to Perlis, Yala and Narathiwat (BMNH), also in SW and S-central Thailand, and is olive-washed tawny on the upper body, with obviously contrasting rufous chestnut cap. From N Perak southward (also in Sumatra), nominate *gularis* has cap deeper, richer chestnut than in typical *connectens*, but only slightly brighter than other upperparts which are tawny chestnut without olive. Intercalated within this range, south from the Kra isthmus, a fourth subspecies, *chersonesophilus* Oberholser 1922 (TL Trang province), is believed to show intermediate characters, but many birds are inseparable from *connectens* and south at least from Krabi individual colour variation signals intergradation with *gularis*. Chasen (1935) and Riley (1938) found the extra name unnecessary, and Deignan's (1963) definition of the distribution of *chersonesophilus* could be taken to cover the type locality of *connectens*. No reason has been found for resurrecting it here.'

Not mentioned by Wells (2007), because already placed in synonymy by Deignan (1963: 147), is *deignani* Meyer de Schauensee 1946 (TL Khao Luang, southwest Thailand at 11° 40′N, 99° 35′E [10° 40′N cited in Deignan (1964: 321) is an error, see Deignan (1963: 147)]). In passing, it may also be noted that because it was not within his geographic scope Wells did not comment upon the view of Deignan (1963: 147) that *inveteratus* was recognisable, restricted to the offshore islets of southeast Thailand (near to Cape Liant). In this, Deignan disagreed with Riley (1938: 349) who rejected *inveteratus* on the basis that its type could be 'matched by specimens from Peninsular Siam'. What we have here, therefore, is a situation where two claimed taxa, *chersonesophilus* and *deignani*, have been assigned type localities within the range ascribed to *connectens* by Kloss, and two others, *archipelagicus* and *inveteratus*, that at least require review. Very probably, all should be placed in the synonymy of *connectens*, but before that step can be taken it is essential to provide a definitive type locality for *connectens*. This can be achieved by neotypification, and the selected neotype would then be the basis for a needed fuller clarification of the situation.

Happily, there is a certain degree of freedom permitted in the selection of a neotype, although it is supposed to come 'as nearly as practicable from the original type locality' (Art. 75.3.6 of the Code). As it happens, we have located a specimen (BMNH 1936.4.12.972), a female, collected by Robinson and Kloss on 17 March 1919 (i.e., soon after the describing of *connectens*) at 'Tasan, Chumporn' (now Ban Tha San, Chumphon province), at 10° 29′ N, 98° 55′ E. As far as we have been able to determine, this makes the closest geographical approach to Kloss's rather general indication. Because iris colour is thought to be important in evaluating this complex (Wells 2007: 336) it is also helpful that on the field label this is given as 'pale yellowish orange'. The

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measurements given on the label (wing 57 mm, bill from gape 17 mm) fit well with those cited by Kloss: 'females: W. 58, 56, 54; B.f.g. 16, 17, 16' and Kloss's description also seems apt, although he did not give distinctions between *connectens* and '*pileata* Blyth' as he called birds from the southern Malay Peninsula (which Wells, 2007, considered to be nominate *gularis* (TL Sumatra)).

The next step would normally be to designate the neotype formally. The Code, however, does not make it entirely clear that we can pass over putative syntypes in favour of a specimen taken by the author of the name at an appropriate location, but a little later in time. In this circumstance, we propose to apply to the International Commission on Zoological Nomenclature to ask it to use its plenary power to designate the neotype or to advise that it sees no problem requiring its attention. Until the Commission responds, of course, our selection is purely provisional.

OTHER MATTERS OF NOMENCLATURE

By listing '*connecteus* [sic]' Deignan (1964: 320) treated this spelling as a *lapsus* and accepted *connectens* as the intended trinomen. However, the presence of two original spellings requires a selection by a First Reviser. This has been investigated and under Art. 24.2.4 of the Code Kloss in Robinson & Kloss (1918) is identified as having made the necessary selection of *connectens* (see David *et al.* 2009). Although this selection is in a work by two authors only Kloss is empowered, by his original authorship of the name, to make the selection and thus it is he who is to be credited, as was done by David *et al.* (2009).

Curiously, there is also a parallel situation with dual spellings of the generic name *Macronous* and *Macronus*. Here, Gray (1855: 41) must be seen to be the First Reviser, and the selected spelling *Macronus* Jardine & Selby 1835 must be used (David *et al.* 2009).

Of two other associated names, '*pileata*' Blyth in the original combination *Prinia pileata*, based on Malacca [now Melaka] birds, is best considered a synonym of nominate *gularis* (see Chasen 1935; Medway & Wells 1976). The second, '*rubricapilla*', was a widely-used but unjustified emendation of the original spelling *rubicapilla* Tickell, 1833, a name now used for Indian birds in the combination *Macronus gularis rubicapillus*. Proponents of prevailing usage may prefer *rubricapillus* despite the fact that the Code (ICZN 1999) provides no satisfactory mechanism for determination of this and permits prevailing usage to change over time, to the detriment of stability.

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SYSTEMATIC NOTES ON ASIAN BIRDS: 72

A preliminary review of the leaf warbler genera *Phylloscopus* and *Seicercus*[1]

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ABSTRACT Recent and proposed taxonomic changes to the warbler genera *Phylloscopus* and *Seicercus* are reviewed within the geographic scope of this series. Their reliability relative to secondary contacts, hybridization, introgression, bioacoustics and molecular genetics is discussed in terms of current species concepts, mainly the Biological Species Concept, and certain previously unpublished data are added in support of taxonomic decisions made. Within the area under consideration, this review records an increase in the number of *Phylloscopus* species from the 33 in Mayr *et al.* (1986) and 44 in del Hoyo *et al.* (2006) to 50. In *Seicercus*, *S. burkii*, a previously merged taxon swarm, has been split into six partly allopatric, partly sympatric species. This enlarging of species number emerges from due application of the results of bioacoustic and molecular genetic analyses to passerine systematics. Homogeneous external morphology largely hid the phylogenetic complexity and richness of these genera, but their species totals are not yet fixed; several populations presently accepted at species level need further substantiation.

KEY WORDS bioacoustics, East Palaearctic, hybridisation, Indo-Malaya, molecular genetics, morphology, Phylloscopinae, *Phylloscopus*, phylogenetics, secondary contact, *Seicercus*, species-limits, systematics, taxonomy, vocalisations.

TAXA COVERED

Genus *Phylloscopus*

The *Phylloscopus* [*collybita*] superspecies
Phylloscopus collybita (p. 48)
Phylloscopus sindianus (p. 48)
Phylloscopus neglectus (p. 49)

The *Phylloscopus* [*fuscatus*] superspecies
Phylloscopus fuscatus (p. 50)
Phylloscopus fuligiventer (p. 52)

***The Phylloscopus* [*affinis*] superspecies**
Phylloscopus affinis (p. 54)
Phylloscopus occisinensis (p. 54)
Phylloscopus griseolus (p. 55)
Phylloscopus subaffinis (p. 55)
Phylloscopus armandii (p. 56)
Phylloscopus schwarzi (p. 57)
Phylloscopus pulcher (p. 57)
Phylloscopus maculipennis (p. 58)

The *Phylloscopus* [*proregulus*] superspecies
Phylloscopus proregulus (p. 59)
Phylloscopus kansuensis (p. 61)
Phylloscopus forresti (p. 62)
Phylloscopus chloronotus (p. 63)
Phylloscopus yunnanensis (p. 63)
Phylloscopus subviridis (p. 64)

The *Phylloscopus inornatus* complex
Phylloscopus inornatus (p. 65)
Phylloscopus humei (p. 66)

The *Phylloscopus* [*borealis*] superspecies
Phylloscopus borealis (p. 68)
Phylloscopus examinandus (p. 70)
Phylloscopus xanthodryas (p. 71)

The *Phylloscopus trochiloides* complex
Phylloscopus trochiloides (p. 72)
Phylloscopus plumbeitarsus (p. 73)

The *Phylloscopus* [*tenellipes*] superspecies
Phylloscopus tenellipes (p. 74)
Phylloscopus borealoides (p. 75)
Phylloscopus magnirostris (p. 75)
Phylloscopus tytleri (p. 76)
Phylloscopus coronatus (p. 76)
Phylloscopus ijimae (p. 77)

The *Phylloscopus* [*reguloides*] superspecies
Phylloscopus reguloides (p. 80)
Phylloscopus claudiae (p. 81)
Phylloscopus goodsoni (p. 81)
Phylloscopus occipitalis (p. 83)

Cont . . .

[1] Results of the Himalaya Expeditions of J. Martens, No. 263.—For No. 262 see pages 71–80 in Hartmann, M. & Weipert, J.(eds), *Biodiversity and Natural Heritage of the Himalaya III*. Erfurt 2009.

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The *Phylloscopus* [*davisoni*] superspecies
Phylloscopus davisoni (p. 84)
Phylloscopus ogilviegranti (p. 85)
Phylloscopus hainanus (p. 86)
Phylloscopus xanthoschistos (p. 86)
Phylloscopus emeiensis (p. 87)

The *Phylloscopus* [*cantator*] superspecies
Phylloscopus cantator (p. 88)
Phylloscopus calciatilis (p. 89)
Phylloscopus ricketti (p. 90)

Southeast Asian and Australasian *Phylloscopus*
Phylloscopus trivirgatus (p. 91)
Phylloscopus olivaceus (p. 92)
Phylloscopus cebuensis (p. 93)
Phylloscopus sarasinorum (p. 93)
Phylloscopus presbytes (p. 93)
Phylloscopus poliocephalus (p. 94)

Genus *Seicercus*

The *Seicercus burkii complex*

The *Seicercus* [*burkii*] *superspecies*
Seicercus burkii (p. 96)
Seicercus tephrocephalus (p. 97)

The *Seicercus* [*valentini*] superspecies
Seicercus valentini (p. 98)
Seicercus whistleri (p. 99)
Seicercus omeiensis (p. 100)
Seicercus soror (p. 101)
Seicercus affinis (p. 101)
Seicercus poliogenys (p. 102)

The *Seicercus castaniceps* complex
Seicercus castaniceps (p. 104)
Seicercus grammiceps (p. 105)
Seicercus montis (p. 105)

INTRODUCTION

This review benefits from the relatively recent survey of the group as a whole by Mayr *et al.* (1986) in Peters's *Check-list of Birds of the World*. That appeared just prior to the advent of the techniques of molecular genetics, which revolutionized avian taxonomy and systematics. Since then, a steadily increasing number of taxonomic and systematic papers has applied these techniques to various sections of the genera *Phylloscopus* and *Seicercus*. Results have not only given insights into the population structure and population genetics of various taxa, but have also helped understanding of evolution and species limits. Their influence on leaf warbler taxonomy is overwhelming. The number of species accepted has increased steadily, mainly by the splitting of long-established polytypic species. Papers such as those of Helbig *et al.* (1996), Irwin *et al.* (2001a), Johansson *et al.* (2007), Martens *et al.* (1999, 2004, 2008), Olsson *et al.* (2004, 2005), Päckert *et al.* (2004, 2009a), and Richman & Price (1992), to mention just a few, are milestones in this respect. The various authors treating *Phylloscopus* and *Seicercus* in del Hoyo *et al.* (2006), on the other hand, made only partial use of these results and upheld a quite conservative view. Since the detailed listing in Mayr *et al.* (1986), six species new to science have been described: *Phylloscopus emeiensis, P. sichuanensis, P. occisinensis, P. calciatilis, Seicercus soror* and *S. omeiensis*, and one subspecies: *P. affinis perflavus*. One of these names occurred in the synonymy of a described species and had been overlooked and 'forgotten' by contemporary taxonomists, with unfortunate consequences. In addition, research focused on molecular differentiation within genetically defined clusters or lineages, when applied to systematic splits has provided quite detailed information on the timing of evolutionary differentiation; also on the location of possible past geographical refuge areas, especially in the Himalayas and China. Details of both have turned out to be considerably more complicated than was formerly believed, especially where evolutionarily deeply split population units ('haplotype clusters' in molecular genetic parlance) are not mirrored by external characters. *Phylloscopus* and *Seicercus* warblers are particularly homogeneously structured, and only molecular genetics makes differences 'visible'.

It should nevertheless be mentioned here that molecular genetic distance values based on just one or two genes among many thousand others, both mitochondrial and nuclear, do not supply the ultimate evidence, or necessarily even the most important evidence, for a relationship at the level of species or below. Rather, such genetic distances are one element, certainly an important one, in combination with others that (a) are a direct reflection of, or (b) could be contributing to, effective isolating mechanisms. Evidence for the existence of

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such mechanisms is basic to the recognition of species and/or species limits according to the Biological Species Concept.

Among passerines generally, Thielcke (1970) considered voice to be an evolutionary pacemaker, and the notion of acoustics has played an especially important role in the systematics of phylloscopines. Insofar as it is relevant to taxonomy, acoustic work on *Phylloscopus* began with the chiffchaff (*P. collybita*) in the W Palaearctic, and this bird featured prominently in the uncovering of vocal variation as a factor in passerine speciation (Martens 1982, Martens & Hänel 1981, Martens & Meincke 1989, Thielcke 1983, Thielcke & Linsenmair 1963, Thielcke *et al.* 1978). Recording work on phylloscopines has since made great strides forward and now covers nearly all of the taxa of our area, the exception being those still poorly researched mountain forms of tropical Southeast Asia and Australasia. Certainly now, acoustic differentiation plays a major role in the group's taxonomy, marked differences hinting at the position of species limits (Alström 2006, Alström & Ranft 2003, Martens 1996, 1998, Mayr 1956). Even so, demonstrations of taxonomic status backed by the evidence of voice playback experiments in the field are still scanty in our area.

With the onset of extended voice recording in the seventies and eighties of the last century in remote areas of the former Soviet Union, in Nepal and in China, it became evident that marked vocal divergencies existed within the boundaries of long-recognised species and even subspecies, in some instances down to small-scale population level, hence the taxonomic value of vocal characters among leaf warblers soon became obvious. Martens (1996) coined the term 'regiolect' for these notable intraspecific differences. Regiolects differ from dialects by the much larger areas of occurrence of their carriers and, apart from narrow zones of contact, by their mutual geographical exclusion. It was further supposed that these vocal differences act as pre-mating isolation barriers, hence that regiolects may indicate species *in statu nascendi* or a speciation event already more or less completed.

Papers such as those of Richman & Price (1992) and Helbig *et al.* (1995, 1996) marked the starting point of taxonomic work that combined the techniques of molecular genetics and comparative acoustics to elucidate relationships among morphologically homogeneous taxa. Soon, it became evident that regiolects did indeed indicate deep genetic differences between carrier populations. Thus, following the work of Helbig *et al.* (1996), the chiffchaff complex was broken into several biological species now accepted as independent (del Hoyo *et al.* 2006, Martens 2000b).

Because *Phylloscopus* is morphologically so extremely homogeneous yet at the same time so astonishingly species-rich, it has been the focus of evolutionary studies attempting to better understand ecological and evolutionary traits in the leaf warbler assemblage. Sample themes relate to the high number of sympatric breeding species (Alexander 1950, Martens & Eck 1995, Price & Jamdar 1991b); the evolution of breeding distributions (Price *et al.* 1997), with special emphasis on the Himalayan avifauna (Johansson *et al.* 2007); molecular genetic aspects of evolution and ecological differentiation (Price 2010, Richman & Price 1992); species swarms (Alström & Olsson 1999, Martens *et al.* 1999); and cryptic species (Olsson *et al.* 2005), together resulting in a revolution, especially of Asian leaf warbler systematics (Rheindt 2006). In addition, the association of habitat and song characteristics has been investigated (Badyaev & Leaf 1997) as have links between vocalisations and phylogeny (Martens 1980), radiation versus molecular genetics and bioacoustics (Päckert *et al.* 2004), phylogeography and the evolutionary time-scale of *Phylloscopus* radiations in the Sino-Himalayan region (Päckert *et al.* 2009b), determinants of northern and southern range limits (Gross & Price 2000), morphology and ecology along an altitudinal gradient (Price 1981), evolution of ecological differences in breeding and non-breeding seasons (Price & Gross 2005), correlates of wing morphology with foraging behaviour and migration distance (Marchetti *et al.* 1995), phylogeny versus ecological diversification and community

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structure (Richman 1996), and the evolution and age structure of ring-species, a subject addressed several times (Bensch *et al.* 2009, Irwin 2000, 2002, Irwin *et al.* 2001b, 2001c, 2005, Martens & Päckert 2007). Based on molecular genetic evidence, a family Phylloscopidae has been erected (Alström *et al.* 2006).

As will be seen in the reflections and discussions of the species account section, taxonomic work on phylloscopines is on-going and in full progress, with many issues yet to be resolved.

METHODOLOGY

This contribution critically reviews systematic and taxonomic papers on Asian species of the genera *Phylloscopus* Boie and *Seicercus* Swainson, and is purely descriptive in nature. Nearly all of the recommended taxonomic changes cited have been published elsewhere, but they are critically discussed and partly revised here. Sufficient time has not yet passed for a completely objective review of all cases, or for gathering all of the extra information needed, thus decisions are coloured by the author's personal experience with phylloscopines. That includes studies of morphology, acoustics and molecular genetics, and field experience mainly in the Himalayas and various other parts of Asia during more than four decades.

In ornithology, it is well-known that rival concepts of 'species' have been in competition and that researchers must necessarily declare their hand (Cracraft 1983, Haffer 1997, Mayden 1997, Zink 1996, Zink & McKitrick 1995). With the onset of molecular genetic systematics, 'species' have often been reduced to strongly split clusters or lineages (discussion in Parkin 2003) whereas the interactions of those clusters in nature, the precondition of the Biological Species Concept set by Ernst Mayr, have in most cases been neglected. Outcomes for *Phylloscopus* and *Seicercus* warblers are especially complicated because in no other group of Palaearctic and Indo-Malayan passerine birds has molecular genetics been so often applied. However, a consequence of vocalisations having also played a major role in deciding splits within traditional species is that the proposals of phylloscopine taxonomists possibly quite often come close to biospecies. It is still true, however, that most newly split taxa are allospecies, or at least are allopatrically distributed. It is a permanent challenge for systematists and evolutionary biologists to locate their contact zones and to elaborate interactions in the field. Among the *Phylloscopus* of our area, so far, not a single such case has been researched adequately (although the situation is better in *Seicercus* where members of the *S. burkii* complex occur sympatrically but in most cases are partitioned altitudinally). As stated, even voice playback experiments have been applied only scantily to the taxa treated here. The species accounts herein are often subdivided, with some or all of the following headings applied, as needed:

Taxa included

The subspecies considered valid that occur regularly in the area (see map in this issue), with type locality added in brackets, and occasionally a range statement. It has sometimes been appropriate to list a subspecies that is extralimital, in which case the term 'EL' and needed additional geographic information are added, the latter to assist in understanding contact zones. This arrangement also allows the number of citations per taxonomic account to be minimised. The only synonyms listed are those actually discussed.

Taxonomy

Deals with the validity of subspecies and with species limits, also with historical context, and highlights those taxonomic questions that the author considers require further research. Museum names are replaced by acronyms, listed below. In a few cases, a general introduction is provided, and this may deal with subspecies groups in succession. Superspecies are all listed here, defined after Amadon (1966) and Amadon & Short (1992) as closely related species that originated more or less contemporaneously and which due to similar ecological requirements are still distributed allopatrically (in most of the cases treated, allospecies are backed by the results of

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molecular genetic analysis). The superspecies concept has the great advantage of allowing closely related species to be retained and discussed in a common evolutionary context. Unless otherwise stated, molecular genetic distance values are derived from analysis of the mitochondrial cytochrome-*b* gene, for long a time the standard gene used in avian molecular analysis. Where other genes, especially of nuclear origin, have been used these are indicated.

General characteristics

Notes on morphological generalities and peculiarities.

Distribution

Includes comment, e.g., on range gaps, contact zones and areas needing further research. Unless otherwise stated, all indications refer to summer and/or breeding distribution.

Vocalisations

Describes in some detail the taxon-bound syntax structure of territorial song, also up- and/or downstrokes within individual notes, and the temporal fine structure of notes and note-groups of closely related species (often the allospecies of superspecies), where differences appear to act in species recognition and/or as a pre-mating isolating mechanism. Often, they are more pronounced than external morphological differences. Sometimes call (as opposed to song) structures are also addressed. The terms used are defined as follows:

Call: Tends to be shorter and simpler than territorial song and is produced by both sexes throughout the year. It usually occurs in particular contexts, often related to specific functions.

Downstroke: see Element.

Element (or note): Particular sound event, continuous line on a sonagram. Different element types can either be described by shape in the sonagram (e.g., downstrokes, upstrokes, with broad or narrow frequency range) or by their tonal quality (clicks, whistles, etc.).

Endless type of song: see Territorial song.

Introductory element (or note): A single or a few, mostly short elements of a fixed type that precede each Verse of a taxon's territorial song. In contrast to elements (notes) within the verse proper, pauses between them may be of irregular length.

Note-group (element-group, or Syllable): Fixed group of two or more different elements, often repeated several times to build a verse.

Phrase: Comprises a set of identical notes or syllables within a verse, where the note or syllable types of subsequent phrases differ in frequency range, modulation and/or length.

Syllable: see Note-group.

Syntax: Denotes order of elements or element/note-groups within a verse. Syntax patterns are schematized by combining different letters, each letter representing a distinct element type. Thus, AAAA = element type A repeated; ABABAB = element types A and B alternating (element group AB repeated). Small letters like aaa or bb indicate very short and/or narrow-frequency elements, often used to indicate Introductory elements.

Territorial song (or just song): Continuous and complex vocalisation of males given during the breeding season. Endless type = song without distinct verses, given in a stereotyped manner as a long series of notes, or various parts of song are given in irregular succession and at short intervals. Verse type = song composed of distinct verses, pauses between verses characteristically longer than the individual verse.

Trill: Multiple, narrowly spaced repetition of a typically short element of a given type. Trills may constitute a whole verse or are part of a verse.

Upstroke: see Element.

Verse: Complex vocalisation of males consisting of various elements or element groups given within territorial song. Verses are separated by distinct pauses, which are normally longer than the verse itself.

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Verse-type of song: see Territorial song.
Warble: A general term to indicate a verse of irregular and difficult-to-describe syntax.

ACRONYMS OF MUSEUM COLLECTIONS

AMNH	American Museum of Natural History, New York
IZAS	Institute of Zoology, Chinese Academy of Sciences, Beijing
MAR	Tissue sample and skin collection of J. Martens, now housed at MTD Dresden
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts
MMNH	Michigan University Museum of Natural History, Ann Arbor, Michigan
MTD	Senckenberg Naturhistorische Sammlungen Dresden (formerly Staatliche Naturhistorische Sammlungen Dresden), Museum für Tierkunde, Dresden
NHM	Natural History Museum, Tring
NME	Naturkundemuseum Erfurt, Erfurt
ZSM	Zoologische Staatsammlung München, Munich

SYSTEMATIC SECTION

Genus *Phylloscopus*

Hartert (1907–1909) differentiated *Phylloscopus* from *Seicercus* by the less broad bill (similar to *Sylvia*), less developed bristles covering the nostrils and in most cases the much more pointed wing. Nests are similarly domed, eggs plain white or with brownish to reddish flecking. He included tropical Southeast Asian taxa in the genus, but this lumping was refuted by Ticehurst (1938) who (with few exceptions) united the tropical forms in genus *Cryptigata* Mathews, on the basis of their differing wing formula. This idea was heavily opposed by Mayr (1944) who re-united all tropical taxa under the one name. Using old names, Wolters (1980) split the genus into eight (plus a number of subgenera). Presently, all taxa, from tropical Africa across the Palaearctic to Southeast Asia and Australasia, are united under *Phylloscopus* (Dickinson 2003, del Hoyo *et al.* 2006), apparently in accordance with the (still incomplete) results of molecular genetic analyses (Johansson *et al.* 2007).

Phylloscopus has turned out to be the most speciose genus of the E Palaearctic and adjacent Indo-Malayan and Australasian realms. Forty-four species of the global 56 listed by del Hoyo *et al.* (2006) originate from our part of Asia , that number now raised to the 50 treated in this review. According to this review, 32 occur in China alone, many of them endemics, a number considerably higher than listed in Cheng (1987), Beaman (1994), King (1997) and Dickinson (2003) but close to that in Zheng (2005). Locally, species density can be remarkably high. Eight or even nine species breed in Kashmir (Alexander 1950, Price & Jamdar 1990, 1991b), as also in various small parts of Nepal (Martens & Eck 1995). The highest diversity recorded to date, however, was along a vertical transect on the southern flank of the Taibai Shan in Shaanxi, China. Eleven *Phylloscopus* (*P. coronatus, P. claudiae, P. davisoni, P. armandii, P. subaffinis, P. trochiloides, P. forresti, P. yunnanensis, P. humei, P. pulcher, P. magnirostris*), four *Seicercus* species of the *S. burkii* complex (*S. tephrocephalus, S. soror, S. omeiensis, S. valentini*) plus *S. castaniceps* occurred in June and July between 1350 m and 3100 m, all in breeding condition and displaying territorial behaviour (author's personal observation). Figure 1 presents a rough idea of the species densities in various parts of Eurasia. Knowledge has advanced considerably in recent years and presently, beside the Himalayas, China east of the Tibetan plateau including the Qing Lin range is to be considered especially rich in sympatric species.

Correct field identification of *Phylloscopus* and *Seicercus* warblers has always been notoriously difficult (cf. Alexander 1955, 1969), and to some degree will continue to be. The many recently split novelties in China and Southeast Asia, in particular, put heavy burdens on field observers, whose work researchers depend on for refining distributional limits and identifying contact zones. Accumulation of a good knowledge of vocalisations is indispensable, and representative collections of tape recordings may help in this respect (cf. Scharringa 1999, 2005, Veprintsev 1987).

With modifications, the following sequence of species follows Mayr *et al.* (1986), Dickinson (2003) and del Hoyo *et al.* (2006) but in parts is slightly re-arranged according to molecular genetic results.

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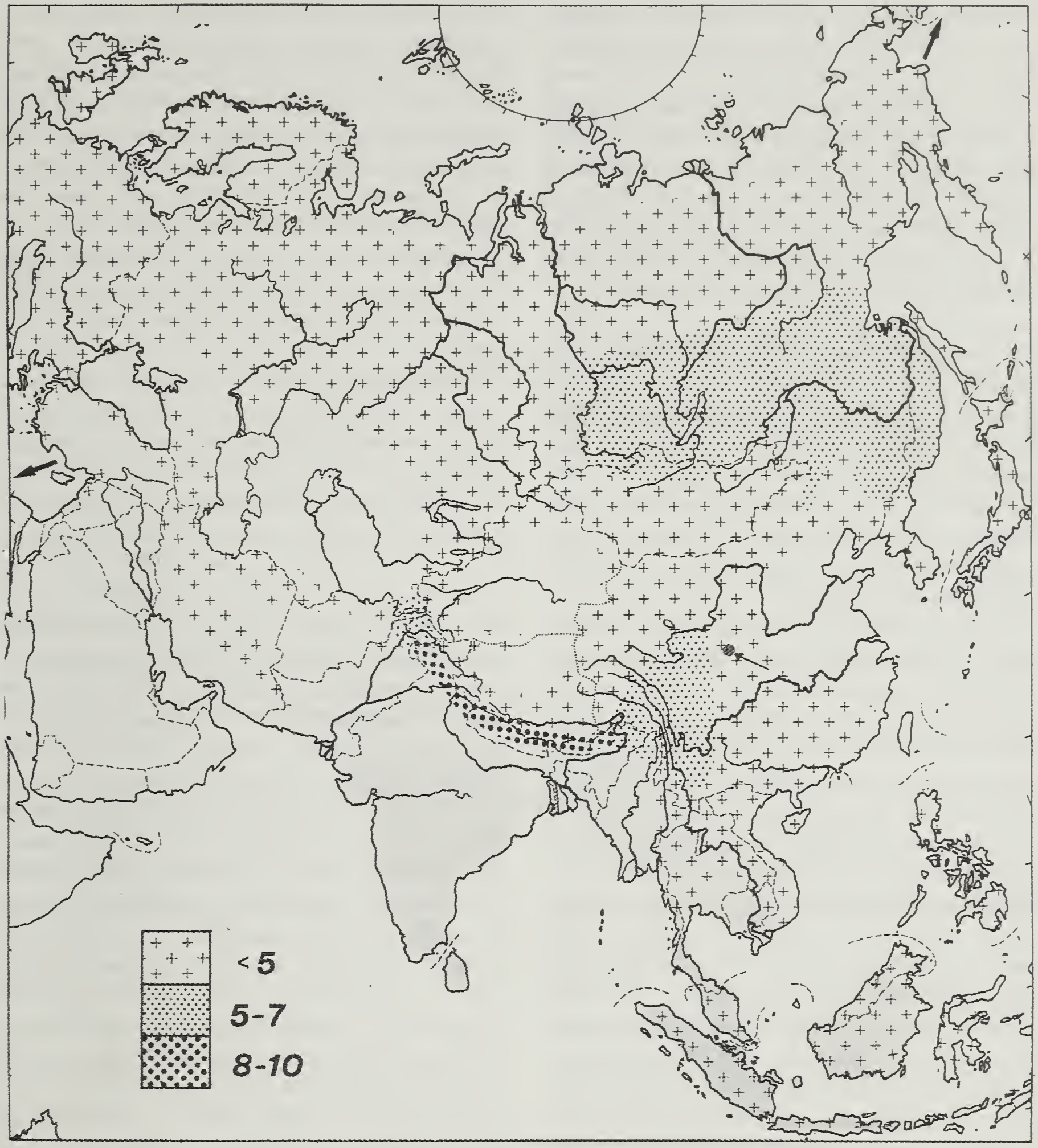

Figure 1. *Phylloscopus* species richness (sympatric but not necessarily syntopic) in the Palaearctic and Indo-Malayan realms (omitting peripheral parts of Europe, N Africa, Alaska and Australasia where generally only one local representative occurs; see heavy arrows). Combined point and arrow in China (southern slopes of Taibai Shan, Shaanxi) indicates co-occurrence of eleven *Phylloscopus*, four *Seicercus* species of the *S. burkii* complex and one of the *castaniceps* complex.
(Modified from Martens 1980)

The *Phylloscopus* [*collybita*] superspecies

Allospecies included (4): *P. collybita* (Vieillot, 1871) *sensu stricto*, *P. canariensis* (Hartwig, 1886) EL, *P. brehmii* [Homeyer, 1871] EL, *P. sindianus* W.E. Brooks, 1880.

The superspecies comprises *P. collybita sensu lato*, extending over the Palaearctic from the Canary Islands and nearly all of Europe and N Asia to E Siberia. Southern area population splinters on islands and on

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mountain ranges of N Turkey, the Caucasus, Iran, and the NW Himalayas have played a major role in understanding the evolutionary biology and speciation of this complex, so rich in geographic representatives. Vaurie (1954, 1959) and Stepanyan (2003) (tentatively) treated high-altitude populations of the Caucasus as a separate species, *P. lorenzii*, because of proximity to an (altitudinally separated but still locally syntopic [Martens 1982]) lowland form.

Phylloscopus collybita (Vieillot, 1817) *sensu stricto*

Taxon included (1; with 2 extralimital forms listed for completeness): *P. c. tristis* Blyth, 1843 [Calcutta, India]; *P. c. abietinus* (Nilsson, 1819) [Sweden] EL; *P. c. fulvescens* (Severtzov, 1873) [Turkestan] EL; four additional subspecies are recognized in the W Palaearctic but are not relevant to our area.

Taxonomy: Within the *P.* [*collybita*] complex Siberian *tristis* poses no problems. In its large range, from roughly the Urals to E Siberia it appears more or less homogeneous on external morphology and song, and Ticehurst (1938) recognized no further subspecies in Siberia. A separate ssp. *fulvescens* representing allegedly intermediate populations between western *abietinus* and eastern *tristis* was found not to be stable (see van den Berg 2009). Its validity had already been abandoned by Ticehurst (1938) but was later resurrected by Vaurie (1954, 1959) and Stepanyan (2003). del Hoyo *et al.* (2006) followed Ticehurst (1938). The situation became more complex when the territorial song of *tristis* was recorded, as it differs markedly from that of the adjacent ssp. *abietinus* of N and E Europe. However, molecular data provided only a low genetic distance value, of 1.7–2.0 %, between *tristis* and W Palaearctic populations (ssp. *collybita*, *abietinus*) (Helbig *et al.* 1996). It is also said that, locally, ssp. *tristis* hybridizes/intergrades with ssp. *abietinus* where they meet along the Urals, but only a few populations, in the northern Urals (Orenburg region), have yet been investigated (Marova & Leonovich 1993). Presently, ssp. *tristis* is generally included in *P. collybita sensu stricto*. However, van den Berg (2009) has proposed that despite only small mitochondrial difference values from western nominate *collybita* and ssp. *abietinus*, *tristis* should be treated as a separate and distinct species due to its different external morphology (coloration), unique territorial song and calls, and apparantly only occasional hybridisation in the area of contact, thus stressing the importance of differences over gene flow.

General characteristics: On coloration, W Palaearctic ssp. and *tristis* do not fit together; *tristis* lacks feather lipochromes (similar to *P. sindianus*, which see).

Distribution: From the Urals across Siberia to close to the Pacific coast, but the coastal areas proper are not included (Dementiev & Gladkov 1968). In our area, ssp. *tristis* as a breeding bird reaches the Altai, possibly including the Chinese Xinjiang side, and NW Mongolia (Mauersberger 1983, Ticehurst 1938).

Vocalisations: Songs of W Palaearctic ssp. and *tristis* differ notably (Helbig *et al.* 1996, Martens 1982, Martens & Meincke 1989). The territorial song of *tristis* is a silvery ringing of continuous long verses up to 5s—astonishingly different from the extremely rhythmically structured western song forms from central to N and E Europe. Mixed song forms were noticed in the Orenburg region of the northern Urals (Marova & Leonovich 1993, I.M. Marova, pers. comm.), but extent of hybridisation and song mixing along the extended Ural mountain range is not worked out as yet. Ssp. *tristis* appears to have been a candidate for raising to species level within the *P. collybita* complex but Russian authors have never discussed this point (cf. Stepanyan 2003, van den Berg 2009).

Sonagrams of ssp. *tristis* are figured in Bergmann *et al.* (2008), Brooks (1992), Glutz v. Blotzheim & Bauer (1991), Helbig *et al.* (1996), Martens (1982, 1996), Martens & Meincke (1989), Rasmussen & Anderton (2005), Schubert (1982) and Schubert & Schubert (1969).

Phylloscopus sindianus W.E. Brooks, 1880

Taxon included (1; with 1 extralimital form listed for completeness): *P. s. sindianus* W.E. Brooks, 1880 [Sukkur, Sind, Pakistan]; *P. s. lorenzii* (Lorenz, 1887) [Kislovodsk, N Caucasus, Russia] EL.

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Taxonomy: External morphology (Vaurie 1954, 1959), vocalisations (Martens 1982) and molecular genetics (Helbig *et al*. 1996) united NW Himalayan *sindianus* and Caucasian *lorenzii* as a clear-cut and closely related taxon pair. Their cytochrome-*b* distance value amounts only to 1.7%, a subspecies level of differentiation between two geographic representatives. Within a complicated phylogenetic tree the present position of *P. sindianus* (incl. ssp. *lorenzii*) is close to Canarian *P. canariensis* (Helbig *et al*. 1996).

General characteristics: Both subspecies of *P. sindianus* belong among the more or less lipochrome-free forms of *P.* [*collybita*], of which group ssp. *tristis* of *P. collybita sensu stricto* is also a part, although there is no close molecular genetic relationship between them (Helbig *et al*. 1996).

Distribution: The range of nominate *sindianus* is the most remote and disjunct one of all Asian representatives of the *P.* [*collybita*] complex: the barren, high-altitude region north of the main Himalayan range and the Karakoram range. There, it lives in sparse bushes and willow thickets, often along water courses (Ali & Ripley 1973, Roberts 1992, author's personal observation). The two subspecies are thus quite disjunct—in central Asia and the Caucasus, but such a distribution is not unique. The rosefinch *Carpodacus rubicilla* and redstart *Phoenicurus erythrogastrus*, as currently understood, display the same pattern.

Vocalisations: The impression of *P. sindianus* song is largely that of a central European chiffchaff (*P. collybita*). This is entirely caused by near identical regularity of note spacing. Decisive for the recognition of *sindianus* song is its formation of individual notes. Besides a variety of descending notes (similar to nominate *collybita*) *sindianus* song also incorporates ascending notes (as does Caucasian *lorenzii*) and, as revealed by field playback experiments during the breeding season, notes of this shape are not 'understood' by central European *P. collybita* (Becker *et al*. 1980, Martens & Hänel 1981, Martens & Meincke 1989).

Sonagrams are figured in Brooks (1992), Helbig *et al*. (1996), Martens (1982, 1996), Martens & Hänel (1981) and Rasmussen & Anderton (2005).

Phylloscopus neglectus Hume, 1870

Taxon included (1): *P. neglectus* Hume, 1870 [A specimen from Bahawalpur, Pakistan, was declared (lecto)type by Ticehurst (1938: 62); Punjab and Doab are mentioned as localities in the original description]. Monotypic.

Taxonomy: No special problems adherent. At times, *P. neclectus* has been treated as a subspecies of *P. collybita*, and Johansen (1947) pointed out that within the range of *neglectus* chiffchaffs are lacking. This is no reasonable logic in itself (see Ticehurst 1938), and the assumed allopatry does not hold everywhere. Thus in Iran *P. neglectus* and *P. collybita* co-occur in the Alborz Mts., although in different habitats, determined by annual precipitation (see Martens 1980: 61). *P. neglectus* is considerably smaller than any chiffchaff and its voice differs from all chiffchaff representatives as well (Martens 1980; see also Vuilleumier 1977). *P. neglectus* has yet to be incorporated into any molecular genetic study and its proper position in the *Phylloscopus* tree is open to question. On morphological grounds alone it is close to *P. collybita*, and *P. tytleri* may also be an ally.

General characteristics: A small species without any yellow tinge and of still unrevealed relationships.

Distribution: This is primarily a bird of dry areas of W Asia, from the W Iranian Alborz Mts. eastwards to NW Pakistan. The only breeding areas in the region under consideration, and described in some detail by Roberts (1992), are high-altitude *Juniperus* forests of Baluchistan and *Pinus gerardiana* forest in the Shingar Range (Zhiob), a continuation of the E Afghan breeding range (Paludan 1959). Breeding records, including just sightings during the alleged breeding season, claimed from further east (Gilgit, Ladakh, Kashmir, Tibet) were critically reviewed by Ticehurst (1938) and (correctly) rejected, mainly for lack of specimens (but see Ali & Ripley 1973, Mayr *et al*. 1986). A record given by Alexander (1950) from the Liddar Valley in Kashmir is mentioned without comment by Roberts (1992), and no

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specimen supports this observation. For the time being, it seems wise to restrict breeding within Pakistan/Indian borders to the area defined by Roberts (1992). However, unexpected extensions have occurred, such as in eastern Turkey (where the species was detected on vocal evidence during field surveys), beyond the known western limit of range (Kirwan *et al.* 2008). A detailed mapping of the species' range was presented by v. Vietinghoff-Scheel (1988a).

Vocalisations: Territorial song is a short warble, 0.7–1.3s long, preceded by a faint introductory note; all notes in a verse differ and they are characterized by steep ascents and descents. Rarely, the individual note combines both of these. The impression is of a song somewhat similar to that of *P. tytleri*, also a NW Indian species. The recording on Veprintsev's disk (1987) does not belong to *P. neglectus*, rather to an (unidentified) *Sylvia* warbler.

Sonagams are figured by Erikson (1988), Martens (1980), and Rasmussen & Anderton (2005).

The *Phylloscopus* [*fuscatus*] superspecies

Allospecies included (2): *P. fuscatus* (Blyth, 1842); *P. fuligiventer* (Hodgson, 1845).

From molecular genetics and distributional data Martens *et al.* (2008) proposed that two central Asian taxa be united as a superspecies, namely *P. fuscatus* and *P. fuligiventer*. Their taxonomy and relationships have long resisted clear understanding and several crucial points are still open to question. By *Phylloscopus* standards, the group's morphology is quite heterogeneous and arrangements relying on external characters alone are ambiguous. Within the area covered, the taxa involved breed mainly in high-altitude open and bushy habitat above the timberline of SE Tibet, the eastern Himalayas and in W China, also within the upper forest belt but never in closed forest.

***Phylloscopus fuscatus* (Blyth, 1842)**

Taxa included (2): *P. f. fuscatus* (Blyth, 1842) [Calcutta, India]; *P. f. robustus* Stresemann, 1923 [Sungpan, Sichuan, China].

Taxonomy: Nominate *fuscatus* is generally accepted as the taxon of the Siberian taiga (del Hoyo *et al.* 2006, Dementiev & Gladkov 1968, Dickinson 2003). *P. f. robustus* from mountainous W China is regarded at best as only a weakly differentiated subspecies. Its validity was rejected by Ticehurst (1938), Vaurie (1954, 1959) and Dementiev & Gladkow (1968), although more recently accepted by Mayr *et al.* (1986), Dickinson (2003) and del Hoyo *et al.* (2006). Five newly collected specimens from Gansu reveal a cytochrome-*b* haplotype that clearly differs from nominate *fuscatus* from Siberia, and a sequence distance value from northern ssp. *fuscatus* that is remarkably high, at 4.8 %. As a consequence, Martens *et al.* (2008) treated *robustus* as a valid subspecies, diagnosable also by coloration and colour pattern, but only slightly by territorial song.

Molecular genetic distance may qualify taxon *robustus* even at species level. However, vocalisations as presently understood are little differentiated (see below), and the interactions of *robustus* and the various *fuscatus* morpho-types on the breeding grounds are unexplored. Martens *et al.* (2008) preferred to retain subspecies status for *robustus*, and that is followed here. At the same time, opinion on the status of the Chinese breeding populations of ssp. *fuscatus* is not unanimous. Cytochrome-*b* sequences taken from the classical collections of Hugo Weigold from Sichuan and Walter Beick from Gansu (Stresemann 1923, 1938) do not wholly coincide with the new material. A genotyped breeding-season skin (15 May) from the Beick collection belongs with northern *fuscatus*, as does a paratype of *robustus* (dated 26 September) from the Weigold collection (Martens *et al.* 2008). In addition, three newly collected specimens from the Taibai Shan and Foping areas of Shaanxi, all dated mid-May (Martens *et al.* 2008: 257) nest firmly within the cytochrome-*b* topology cluster of nominate *fuscatus*, although they represent unique haplotypes, so far unknown in Siberian and Mongolian populations (Martens *et al.* 2008). The data set presently available indicates the presence in China of possibly three different taxa during the breeding season: (i) ssp. *robustus*, (ii) nominate *fuscatus*, and (iii) specimens from Shaanxi representing unique haplotypes but

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which nest within (ii), the northern haplotype cluster. Taxonomically, this is not a clear situation at all, and questions remain. Do birds with northern (*fuscatus*) haplotypes breed in western China or do they represent late migrants that were collected amidst local *robustus* breeders? If they do breed locally, do they mix with *robustus* birds? The three Shaanxi specimens, dated 11–18 May, differ in coloration from both *robustus* and *fuscatus* (colour photo images in Martens *et al.* 2008, Fig. 10a). So do they or do they not represent a locally diverged breeding population of northern *fuscatus*? In addition, the molecular phylogenetic approach has revealed that *weigoldi* Stresemann is not a part of *P. fuscatus* but belongs to *P. fuligiventer* (which see). Vaurie (1954, 1959) regarded *P. fuligiventer* as part of *P. fuscatus* and maintained this opinion in his work on the birds of Tibet (1972).

General characteristics: Beside nominate *fuscatus*, which breeds in NE China as an extension of the Siberian population (Cheng 1987), three 'morpho-types' can be distinguished within China. These differ remarkably in coloration and correspond to two molecular sub-branches plus a group in SW China with (as far as known) unshared haplotypes (not found in *robustus* populations). They are treatable as:

a) *P. fuscatus fuscatus*: Material from the Weigold collection (from Jehol [now Hebei], NE China) generally has a quite gloomy appearance. Breast band only weakly developed or nearly absent; belly with a broad, dirty whitish-tinged centre; consequently extension of the brown of the flanks is much reduced. Except for the lower tail-coverts, this form is the least warmly tinged one.

b) *P. fuscatus robustus*: Described by Stresemann (1923) on the basis of 'dirty yellowish' belly (instead of a more shining white one as in nominate *fuscatus*). The five newly collected skins from Gansu (May, June) have a rather broad, gloomy but warm brownish breast band, which continues into the brownish flanks; the latter with a slightly more yellowish touch. Only the narrow centre of the belly is dirty white (rather than yellowish), otherwise constricted by the extended brownish flanks.

c) *P. fuscatus* cf. *fuscatus*: Genetically, three May-dated specimens from Shaanxi (MTD C 63097, MTD C 63098, MTD C 63099) fall within the nominate *fuscatus* clade. They are remarkably lighter than *robustus* on breast and belly and the whitish belly centre is more extended than in *robustus*. The brownish coloration on the flanks tends to a touch of reddish. General coloration of the underside including throat is conspicuously lighter than in *robustus* and the brown has a warm yellowish tinge (colour photo images in Martens *et al.* 2008).

Distribution: The confirmed breeding range of *P. fuscatus* occupies two disjunct areas: nominate *fuscatus* in Siberia/Mongolia/northeastern-most China and ssp. *robustus* in parts of SW China, namely locally in Sichuan, Gansu, Shaanxi (Cheng 1987, Ticehurst 1938, Vaurie 1954, 1957). However, distributional maps differ: Baker (1997) and del Hoyo *et al.* (2006) included a continuous area across the deserts of Inner Mongolia and much of the forested area of southwestern China, whereas in Cheng (1987), Chrabryj *et al.* (1989a) and Glutz v. Blotzheim & Bauer (1991) two separate areas, a northern one and a southern one, are probably correctly separated by the Mongolian deserts (see Fig. 9 in Martens *et al.* 2011 for *P. fuscatus* distribution, based mainly on molecular data). The former *fuscatus* ssp., *weigoldi*, is now part of *P. fuligiventer* (which see).

Vocalisations: Territorial songs in *P. fuscatus* are rather simply structured and include almost exclusively trills, i.e., repetitions of a single song element, rarely of two-note groups. The individual male possesses a rich repertoire. Three nominate *fuscatus* displayed up to fifteen verse types, and two *robustus* from Gansu nine verse types each. Among eight males of nominate *fuscatus* only two songs with repeated two-note syllables (note groups) were found. The individual note can be steeply descending, ascending, or may be highly modulated, and the opening note is often a short one or is otherwise modified. Double trills are common

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in the repertoires of both nominate *fuscatus* and Chinese *robustus*.

Songs of nominate *fuscatus* from Siberia/Mongolia and of ssp. *robustus* do not differ notably in pattern and note repertoire, although there are subtle differences in spectral parameters. Songs from the latter Chinese population are somewhat higher-pitched and frequency range is broader (from 2.1 up to 5.8 kHz) compared with Siberian songs (2.2–5.1 kHz). In addition, notes in *robustus* song are more widely spaced within the verse, giving it a slow and somewhat 'tired" auditory impression. Verses comprise 4.5–7 (mostly 5) notes/s (2 males), while nominate *fuscatus* verses comprise 6 to 12 (mostly 8–12) notes/s (8 males) (Martens *et al.* 2008). Forstmeier & Balsby (2002) distinguish two song types in Siberian *P. fuscatus*: individually specific, stereotyped song ('S-song') and a highly variable song type ('V-song'). S-song is used as an individually recognizable signature to mark the claimed territory area. V-song appears to advertise male quality, functioning to attract females for copulations.

Sonagrams of *P. fuscatus* territorial songs and calls are figured in Bergmann *et al.* (2008), Forstmeier & Balsby (2002), Glutz von Blotzheim & Bauer (1991), Martens (1980), Martens *et al.* (2008), Rasmussen & Anderton (2005), and Schubert (1982).

Phylloscopus fuligiventer (Hodgson, 1845)

Taxa included (3): *P. f. fuligiventer* (Hodgson, 1845) [Nepal]; *P. f. tibetanus* Ticehurst, 1937 [Tsari, southern Tibet]; *P. f. weigoldi* Stresemann, 1923 [Dschiësongea, near Tatsiénlu (=Kangding), Sichuan, China].

Taxonomy: This bird has a quite complicated taxonomic history. Originally, the Himalayan taxon *fuligiventer* was considered a species separate from a neighbouring, morphologically similar SE Tibetan taxon, *tibetanus*, and was treated as such by Ticehurst (1937, 1938). Vaurie (1954, 1959) lumped both with *P. fuscatus*, to which he also added the high-altitude W Chinese *weigoldi* (see above, under *P. fuscatus*), as had Ticehurst (1938). Williamson (1976), Wolters (1980), Mayr *et al.* (1986) and Brooks (1992) accepted two species, namely *P. fuligiventer* (including ssp. *tibetanus*) and *P. fuscatus* (including ssp. *robustus* and ssp. *weigoldi*), but only Brooks (1992) explained his reasons. Dickinson (2003) followed this two-species view. Rasmussen & Anderton (2005) suggested close relationships between *P. fuligiventer* and *P. fuscatus weigoldi*, but actually transferred only ssp. *tibetanus* to *P. fuscatus*, again, without presenting substantial reasons. This rendered *P. fuligiventer* monotypic and restricted it to a small area of the eastern Himalayas. From molecular genetic data (mt and nuclear), Johansson *et al.* (2007) suggested a sister species relationship between *P. fuscatus* and *P. fuligiventer*. A more detailed analysis revealed that *P. fuligiventer* is indeed correctly placed close to *P. fuscatus* but of the latter it turned out to be sister only to Chinese *weigoldi*. These two differ by only a 1.3 % cytochrome-*b* distance value (Martens *et al.* 2008), a clear hint of relationship at subspecies level at best, whereas *P. fuligiventer* and other local representatives of *P. fuscatus* are separated by remarkably higher distance values (Martens *et al.* 2008, and see above). Accordingly, the *P. fuscatus* complex was re-arranged, with *P. 'fuscatus' weigoldi* now a part of *P. fuligiventer* at subspecies level.

General characteristics: The two paratypes of *weigoldi* and four more skins newly collected from Qinghai lack a clear breast band, and the warm brownish tinge on the underside is missing. The difference in coloration between *weigoldi* on the one hand and nominate *fuligiventer* and *P. f. tibetanus* on the other is remarkable. The latter two are dark greyish to near black on the upper side, with a strong olive tinge on the underside, ssp. *tibetanus* being the more blackish-coloured form. Ssp. *weigoldi* is much lighter grey and, by *Phylloscopus* colour variation standards, remarkably dissimilar to the others (colour photo images in Martens *et al.* 2008).

As with the Qinghai *weigoldi* population, *P. fuligiventer* is everywhere a high-altitude species, restricted to habitats above the

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timber-line in SE Tibet (ssp. *tibetanus*) and in the Himalayas from central Nepal eastwards (nominate *fuligiventer*) (Ludlow & Kinnear 1944, Martens & Eck 1995). Originally, taxon *weigoldi* had been erected as a species apart because it was found in close proximity to *P. fuscatus robustus* during the breeding season (Schäfer & Meyer de Schauensee 1938, Stresemann 1923), good logic, as the current affiliation to *P. fuligiventer* demonstrates.

Distribution: The range of *P. fuligiventer* in the current sense stretches from central Nepal all over the E Himalayas to SE Tibet, W Sichuan and Qinghai. Ssp. *tibetanus* occupies SE Tibet and the northern slopes of the Himalayas (Cheng 1987, Ludlow & Kinnear 1944, Rasmussen & Anderton 2005), continuous with the Himalayan range of nominate *fuligiventer* (Inskipp & Inskipp 1991, Martens & Eck 1995). Ssp. *weigoldi* occurs, possibly disjunctly, in high-altitude areas of SE Qinghai and W Sichuan. If one exists, its contact zone with other subspecies is not known (See Fig. 9 in Martens *et al.* 2011 for distribution of *fuligiventer* based mainly on molecular data.

Vocalisations: At first impression, songs of ssp. *weigoldi* (Qinghai) seem to match the overall song pattern of the *fuscatus* group, but they differ distinctly in syntax and note repertoire. Trill units of *weigoldi* (and nominate *fuligiventer*) are much more complex than those of Siberian *fuscatus*. True trills are common, but some song types include trill units composed of several short elements in rapid succession, amounting to temporally highly compressed syllables. Additional to simple trill songs, many song types comprise two to four successive phrases. Note and syllable types of succeeding phrases differ in frequency range, modulation and/or length. Apart from structural features, songs of *weigoldi* also differ significantly from those of *fuscatus/robustus* in several spectral parameters: they are higher pitched and more broad-banded, i.e., range of frequencies is larger, and single elements are more strongly modulated (Martens *et al.* 2008). Nominate *fuligiventer* song is only known from a single verse recorded in E Nepal: comprising repeated note-groups of four notes each. The call is a double click in the frequency range about 3.5–8.5 kHz. This is a surprisingly silent species. At high-altitude breeding sites above 4000 m in E Nepal at the end of May, beside sparse verses only long series of calls were heard (Martens & Eck 1995). Of ssp. *tibetanus*, from May to August Ludlow & Kinnear (1944) noted 'We heard no song'.

Sonagrams are figured in Martens (1980, *fuscatus*), Martens & Eck (1995, *fuscatus, fuligiventer*), Martens *et al.* (2008, *robustus, weigoldi*), Rasmussen & Anderton (2005, *fuscatus, weigoldi, fuligiventer*).

The *Phylloscopus* [*affinis*] superspecies

Allospecies included (3): *P. affinis* (Tickell, 1833); *P. occisinensis* Martens, Sun & Päckert, 2008; *P. griseolus* Blyth, 1840.

The superspecies consists of the geographic representatives of *P. affinis* (Tickell, 1833) *sensu lato*. Traditionally, *P. affinis* has been regarded as monotypic, with no subspecies erected. After Ticehurst (1938: 74) had surveyed more than 300 *affinis* skins he explicitly stated: 'Over the huge breeding area of *affinis* I can see not the slightest geographical variation; this, I think, is what might be expected in a bird whose haunts are at very high elevations in the same kind of terrain and climate wherever it is found.' Backed by this statement, the discovery of profound molecular genetic differences between various *affinis* populations was unexpected. There is a deep molecular genetic break between Himalayan populations and those in mountainous SW China, amounting to a remarkable 16 % distance value for the cytochrome-*b* gene. Another break occurs within the Himalayan population, namely between its extreme western parts in Pakistan and Kashmir, and the remainder, including of SE Tibet. Moreover, external morphology and habitats (see below) are by no means as homogeneous as was stated by Ticehurst (1938). Molecular genetic, morphological and vocal differences have consequently split *P. affinis* into three taxa: initially into *P. affinis* (Tickell, 1933) *sensu stricto* and *P. occisinensis* Martens, Sun & Päckert, 2008, then *P. affinis* divided into two subspecies: nominate *P. a. affinis* and *P. a. perflavus* Martens, Sun & Päckert, 2008.

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Moreover, *P. griseolus* has turned out to be a relative of the *affinis* complex. In the molecular genetic tree it is sister to the whole *affinis* complex, although with low statistical support. In a tree combining three genes (tRNA, 16SrRNA, cyt*b*) it is sister to *P. occisinensis* alone, but again with low support. *P. griseolus* is thus incorporated in the superspecies *P.* [*affinis*], but tentatively only. V. Vietinghoff-Scheel (1986a) presented a detailed map of the distribution of *P. affinis sensu lato*.

Phylloscopus affinis (Tickell, 1833) *sensu stricto*

Taxa included (2): *P. a. perflavus* Martens, Sun & Päckert, 2008 [Vale of Kashmir, India]; *P. a. affinis* (Tickell, 1833) [Barabhúm and Dholbhúm, Bengal, India;—type locality of neotype: Khumdzung (= Khumjung) village, Khumbu, southwestern Mt. Everest massif, Nepal].

Taxonomy: In the now-accepted much reduced area of occurrence of this species, two subspecies are to be recognised. *P. a. affinis* is the E Himalayan and SE Tibetan form, cytochrome-*b* distance value from the W Himalayan form, *P. a. perflavus*, 3.4 %. A value this high may even hint at species status for *perflavus*. However, vocalisations of *perflavus* are unrecorded and await analytic description. Species *P. affinis* had to be re-defined and a neotype selected, deposited in ZSM Munich (Martens *et al.* 2008).

General characteristics: By *Phylloscopus* standards, nominate *affinis* and ssp. *perflavus* are remarkably different in coloration. While *affinis* is dark brownish on the upper side and light, dull greenish-yellowish on breast and belly, without a marked breast band, *perflavus* displays a dark brownish green tinge above and is bright yellow below with no trace of a breast band and without differently coloured flanks. Also, the eye-stripe is much more marked and longer in *perflavus* than in *affinis*. These differences are easily told apart in well-prepared skins and are even more marked than colour photo images in Martens *et al.* (2008: Fig. 12a) let us suggest. Lu (2008) gave a lucid account of *affinis* biology in the SE Tibetan breeding area.

Distribution: Widespread in high altitude open bush and low *Rhododendron* scrub all over the Himalayan chain and parts of S Tibet; in the Inner Valleys of NW Nepal also in open glades and bushy areas within the forest zone (Martens & Eck 1995). Ssp. *perflavus* occupies the N Pakistan/Karakoram range (Ali & Ripley 1973, Roberts 1992) and Kashmir (Bates & Lowther 1952), but its eastern limit (the contact zone with nominate *affinis*) is not defined as yet. Nominate *affinis* lives east of *perflavus*, extending apparently all over the eastern Himalayan chain and at least parts of SE Tibet, including near Lhasa from where samples have been sequenced.

Vocalisations: All members of the *P. affinis* complex (including *P. occisinensis* and *P. griseolus*) share roughly one song pattern: simple trill songs. In *P. a. affinis*, territorial songs are generally introduced by one or two unmodified call-notes. This uniform song pattern is distributed across the superspecies breeding range, from the Himalayas to adjacent Tibet, Qinghai and Gansu (but see slight differences in *P. griseolus*, below). As far as known, only slight taxon-bound differences in spectral and temporal parameters exist, but, as stated, territorial song and calls of *P. a. perflavus* are unrecorded.

Sonagrams of nominate *affinis* are figured in Martens (1980), Martens *et al.* (2008) and Rasmussen & Anderton (2005).

Phylloscopus occisinensis Martens, Sun & Päckert, 2008

Taxon included (1): *P. occisinensis* Martens, Sun & Päckert, 2008 [Lake Donggi Cona near Huashixia, Qinghai, China]. Monotypic.

Taxonomy: The description of this new species from W China was based on a split of the then current *P. affinis*. The latter's Sino-Himalayan distribution was found to cover a considerable hitherto undetected diversity. The *'affinis'* populations from mountainous parts of the provinces Qinghai, Gansu, Sichuan and Yunnan in SW China differ from those of the Himalayas by an astonishingly high cytochrome-*b* sequence distance value of 16 %, with considerable differences in coloration and

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pattern, and slightly different vocalisations. Though a contact zone with Himalayan *P. affinis sensu stricto* has not been found, in combination, differences support the view that easternmost populations of the *affinis* complex are best treated as a separate species (Martens *et al.* 2008).

General characteristics: Medium-sized leaf warbler of the *P. affinis* group with long, bright yellow supercilium; eye-stripe broad, distinct in front of eye; plumage dark brownish green above, bright yellow below; breast band brownish beige at sides, in fresh plumage tending to orange in centre; flanks darkened to greyish beige; no wing-bar; tips of rectrices with narrow light fringes (skin photo images in Martens *et al.* 2008).

Distribution: Chinese endemic. Up to now, known from high-altitude ranges in the W Chinese provinces Qinghai, Gansu, Sichuan and Yunnan. Apparently, all older records from these areas belong to *occisinensis*, and records in Cheng (1987) are taken to belong there too. Though not yet known on the ground, a contact zone with the Himalayan *P. a. affinis* may be expected in SW Yunnan.

Vocalisations: The voice of Chinese (Qinghai/Gansu) birds covers a lower and slightly broader frequency range than that of Nepal birds. Only in the Qinghai/Gansu population were song types of a pattern different from *affinis* found: double or even triple trills, some of these with a markedly descending frequency trend. These song types were found in repertoires of four out of 19 Qinghai/Gansu males. Individual males possessed up to eleven different song variants. *P. occisinensis* trills are also more rapid than in the Nepal population of *P. affinis*. Peculiarities of the *occisinensis* song were already correctly described verbally by H. Weigold (in Stresemann 1923).

Sonagrams are figured in Martens *et al.* (2008).

Phylloscopus griseolus (Blyth, 1840)

Taxon included (1): *P. griseolus* Blyth, 1840 [Calcutta, India]. Monotypic.

Taxonomy: No problems are to be discussed. *P. griseolus* is a close relative of *P. affinis* and *P. occisinensis* and an evident valid member of the *affinis* superspecies.

General characteristics: Lucid reports on the distribution and biology, including nesting and moult, of this leaf warbler were presented by Kovshar & Gavrilov (1976) and Loskot (1990).

Distribution: In our area, the dry northern slopes of the Himalayas from Chitral to N Himachal Pradesh (Rasmussen & Anderton 2005, Roberts 1992). Its range is otherwise mostly central Asian, embracing SW, W and NW parts of the Tibetan plateau (Loskot & v. Vietinghoff-Scheel 1991), the Pamirs, and Tian Shan to NW China and SE Siberia (Cheng 1987, Dementiev & Gladkov 1968). It is possibly just sympatric with *P. affinis* in the northern Himalayas of Pakistan and India (maps in Rasmussen & Anderton 2005, Roberts 1992) but is largely disjunct from *P. occisinensis*. Loskot & v. Vietinghoff-Scheel (1991) presented a detailed map of the distributional area.

Vocalisations: The song of *P. griseolus* is lower-pitched and conspicuously more narrow-banded than those of other *affinis* allospecies. Element shifts are less steep and less modulated, and besides a homogeneous trill song the repertoire encompasses phrases of repeated two-note syllables. Also in this species, songs are introduced by short call-like click-notes, but these are faint and not as accentuated as in *P. affinis* songs (Ernst 1992).

Sonagrams are figured in Martens (1980), Martens *et al.* (2008) and Rasmussen & Anderton (2005).

Phylloscopus subaffinis Ogilvie-Grant, 1900

Taxon included (1): *P. subaffinis* Ogilvie-Grant, 1900 [Pu'an, SW Guizhou, China]. Monotypic.

Taxonomy: There are no adherent problems to be discussed. Alström *et al.* (1993) clarified the taxonomic status of *P. s. arcanus* Ripley, 1950, described from three individuals wintering in W Nepal. These turned out to belong to *Cettia f. flavolivacea*. It is noteworthy that neither Vaurie (1954) nor Mayr *et al.* (1986) noticed the false generic affiliation of *arcuanus*, though they investigated the type material. Williamson (1976) and Mayr *et al.* (1986) treated *P. affinis* and *P. subaffinis* as conspecific despite

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their quite different external morphology and partly sympatric distribution. On many issues, Alström & Olsson (1992) indicated this treatment as being wrong, and that earlier authors had been right in separating them at species level. On evidence of molecular analysis (Johansson *et al.* 2007 [mt and nuclear DNA], Martens *et al.* 2008) they are not even closely related. A mitochondrial molecular genetic survey of seven samples from Sichuan, Shaanxi, Yunnan and Jiangxi provinces, China, detected only two cytochrome-*b* haplotypes, one in Yunnan, the other one in the remaining provinces (Martens *et al.* 2008). Presently, no phylogeographic signal is detectable.

Distribution: A Chinese endemic and in most places not a common bird. Cheng (1987) presented records from most western and eastern provinces, and v. Vietinghoff-Scheel (1988c) presented an outline map of the then known distributional area (the map in del Hoyo *et al.* [2006] covers all China south of the Qin Ling Range). One record enlarges the confirmed range: a skin specimen (MTD Dresden) dated 31 May 2008, collected at 1700 m, Zhashuping (30°48′N:109°58′E), Hubei province. Differently from elsewhere in its Chinese distribution, on the Huanggang Shan, highest part of the SE Chinese Wuyi Shan range, *P. subaffinis* occupies sparse, open bushy habitat embedded in extensive grasslands, above the timberline upward from 1850 m to close to the summit (author's personal observation).

Vocalisations: Territorial song is a sequence of more or less identical syllables, every syllable comprising 2–3 narrowly spaced notes. The verse is about 1.5 s long. Generally, there are no preceding introductory notes, but the single sonagram in Alström & Olsson (1992) shows a faint one. Call-notes are short double clicks, less than 2 kHz broad.

Sonagrams are figured in Alström & Olsson (1992) and Rasmussen & Anderton (2005).

Phylloscopus armandii (Milne-Edwards, 1865)

Taxa included (2): *P. a. armandii* (Milne-Edwards, 1865) [type locality originally not indicated, but types from mountains W and NW of Beijing]; *P. a. perplexus* Ticehurst, 1934 [Cien-Chuan Valley, 26°40′N, NW Yunnan, China].

Taxonomy: This widespread species was monotypic until Ticehurst (1934) described ssp. *perplexus* from NW Yunnan, in the southern part of its range. A molecular genetic survey (Martens *et al.* 2008) revealed genetic distance values of the cytochrome-*b* gene between northern nominate *armandii* and southern *perplexus* of 5.2%, a strong indication of the species status of the two populations. From cytochrome-*b* sequencing, samples from Nei Mongol, S Gansu (Lianhua Shan Reserve), N Sichuan (Jiuzhaigou) and S Shaanxi (Taibai Shan) represent nominate *armandii*, those from NW Yunnan (near Zhongdian), SW Sichuan (Kangding; Mamize Nature Reserve) and a winterer from Myanmar were attributable to ssp. *perplexus*. From these records, an allopatric distribution is obvious (the two are said to meet in mid-Sichuan), and high taxonomic ranking seems indicated from the large genetic difference between taxa. Territorial song analysis, on the other hand, has not revealed any substantial differences indicative of two gene pools—except for a short additional note to verses present only in ssp. *perplexus* (see below). This is a small acoustic difference and hardly supports a species-level split between *armandii* and *perplexus*. Consequently, subspecies status is retained (Martens *et al.* 2008). Even so, morphological differences in fresh material are marked (see below).

General characteristics: There is a marked difference in coloration between freshly collected *perplexus* and *armandii* specimens, *perplexus* displaying a more distinct breast band and lighter belly with less conspicuous yellow. Slight coloration differences had already been indicated by Ticehurst (1934, 1938; colour photo images in Martens *et al.* 2008, Fig. 14).

Distribution: Chinese endemic. Ticehurst (1934, 1938) gave as the breeding range of *perplexus* SW Sichuan, SE Chwanben (i.e., western Sichuan) and N Yunnan. V. Vietinghoff-Scheel (1984a) presented an outlined map of the then known distributional area. The map and text in Cheng (1987) are somewhat contradictory, southern *perplexus* being

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mentioned for the northern province of Ningxia but, correctly, not so shown on the map. Also, in the south-eastern part of the species range his portrayed distribution points somewhat 'interdigitate', contrary to recent genetic results which indicate an allopatric distribution between taxa (see above). del Hoyo *et al.* (2006) largely adhered to Cheng's assessment. Subsequently, Martens *et al.* (2008) presented sonagrams of two individuals recorded in June 2006 considerably east of the known breeding range, in the Wuji Shan range, Jiangxi province, in bushy habitat above the timberline at about 1900 m on Huanggang Shan.

Vocalisations: The territorial song pattern of *P. armandii* is more variable, and individual song repertoires of males even larger, than in *P. fuscatus* and the *P. affinis* group. As in these two, the large intraspecific variation of song pattern in *P. armandii* involves simple and double trills, also clearly bipartite songs composed of a syllable (i.e., a note-group) part and a trill part. In most bipartite songs (including double-trill verses) the second trill part is lower-pitched than the first part. Rare song types start with a trill or a double note but terminate in a phrase of repeated syllables, or they entirely lack a trill part (Li *et al.* 2009, Martens *et al.* 2008). At present, no divergence between nominate *armandii* and ssp. *perplexus* has been detected in respect of song pattern, frequency range or temporal parameters--except for one minute difference: the presence in a number of *perplexus* verses of a short additional harmonic-rich note after the introductory notes of the territorial song. Maximum and minimum frequencies of song cover a broad range, between 2.1 and 7.4 kHz in both subspecies.

Sonagrams are figured in Li *et al.* (2009) and Martens *et al.* (2008).

Phylloscopus schwarzi (Radde, 1863)

Taxon included (1): *Phylloscopus schwarzi* (Radde, 1863) [Tarei Nor and Bureya Mt., far-E Russia]. Monotypic.

Taxonomy: No special problem adherent. In molecular phylogenetic analyses the position of *P. schwarzi* has varied, from being sister to Chinese *P. armandii* (Johansson *et al.* 2007, mt and nuclear DNA), well in accord with morphological traits (Glutz v. Blotzheim & Bauer 1991, Ticehurst 1938), to sister to a clade comprising, among others, the *P.* [*proregulus*] superspecies and the *Seicercus burkii* complex, but with statistical support low (Päckert *et al.* 2004). Nevertheless, *armandii* is basal in this clade and, again, its close relationship with *schwarzi* is obvious.

General characteristics: More of an arboreal species, while *P. armandii*, its closest relative, is bush-layer bound (Martens *et al.* 2008). On evidence of behaviour, Yamashina (1938) assigned *schwarzi* to a different genus, *Herbivocula* Swinhoe, backing the opinion of Hartert (1907–1909) and Hartert & Steinbacher (1934), but none of this is supported by molecular genetic studies (Johansson *et al.* 2007).

Distribution: A typical pan-Siberian taiga species that reaches our area as a breeding bird only marginally, in NE China (Nei Mongol and Heilongjiang) (Cheng 1987) and N Korea (Duckworth & Moores 2008, Fiebig 1995, Tomek 2002, Vaurie 1959).

Vocalisations: Territorial song is mostly trill-like and consists of a repetition of a single downstroke or upstroke note, or combined down- and upstroke or vice versa. Rarely, the verse is composed of a repetition of a two-note syllable (Martens 1980). The single-note repetition is by far the most common verse type, lasting hardly longer than 1s, in most cases less, and frequency changes are extremely rapid (Martens 1980, Päckert *et al.* 2004). There is no obvious similarity in song pattern with the related *P. armandii* (Martens *et al.* 2008, Päckert *et al.* 2004).

Phylloscopus pulcher Blyth, 1845

Taxa included (2): *P. p. pulcher* Blyth, 1845 [Nepal]; *P. p. kangrae* Ticehurst, 1923 [Simla, NW Himalaya, India].

Taxonomy: No special problems adherent. Presently, only two subspecies have been described, *kangrae* from the NW Himalayas, all other parts of the range being occupied by nominate *pulcher*. Differences between them are slight and refer to *pulcher*'s more yellowish versus darker olive upperparts, less dark

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head, and underparts 'a trifle paler' (Ticehurst 1938). It is unknown if these colour differences are matched by measurable vocal or genetic differences.

General characteristics: Throughout its range, mostly a common bird in high-altitude coniferous forests. The two outer rectrices are conspicuously white—a good field mark.

Distribution: The relatively large area occupied stretches in the Himalayas from W Himachal Pradesh eastward to Bhutan and the NE Indian hills (Grimmett *et al.* 1998), onward into the mountainous areas of W China, northward to E Qinghai and SW Gansu and eastward to the Qing Lin range (Taibai Shan) (Cheng 1987). V. Vietinghoff-Scheel (1984c) presented a detailed map of the then known area.

Vocalisations (Fig. 2a): Territorial song belongs to the 'endless type'. No obvious verses are definable, rather a loose succession of three qualitatively different parts: (i) rattling, verse-like sequences about 2 s long composed of a repetition of two-note groups and each containing small series of two to three different such note-groups; (ii) a long drawn-out trill of extremely short notes of broad frequency range (3–8 kHz maximum), notes rapidly descending in frequency, and their spacing increasing towards the end of the trill; (iii) song-parts (i) and (ii) combined by loose, linking sequences of short, V-shaped notes of narrow frequency range. The auditory impression is normally of rattle and trill parts, and song display may last for minutes (Martens 1980). The general impression of *pulcher* song from sonagrams is very similar to that of *P. subviridis*. However, molecular genetics finds no close relationship between them; instead it positions *P. pulcher* close to *P. maculipennis* (Johansson *et al.* 2007).

Sonagrams are figured by Martens (1980) and Rasmussen & Anderton (2005).

Phylloscopus maculipennis (Blyth, 1867)

Taxa included (2): *P. m. virens* Ticehurst, 1926 [Saraj, Punjab, Indian Himalayas]; *P. m. maculipennis* (Blyth, 1867) ['Nipâl or Sikhim', restricted by Ripley (1950) to E Nepal; syn. *P. m. centralis* Ripley, 1950)].

Taxonomy: Ripley (1950) placed a ssp. *P. m. centralis* of W and central Nepal (type locality Rekcha, Dailekh District, W Nepal) between the paler subspecies *virens* west of Kumaon and the darker nominate subspecies from Sikkim eastward. Vaurie (1954) found geographical variation along the Himalayas 'clinal and very gradual' and the 'the difference in coloration at both extremes of the cline ... relatively slight'. He did not accept nomenclatorial recognition of an intermediate population and synonymised *centralis* with nominate *maculipennis*. In the molecular genetic tree topology, *P. maculipennis* ranks as sister to *P. pulcher*—a quite differently coloured species but both of them exhibit white outer rectrices.

Distribution: Along the Himalayan chain except for the extreme W (not mentioned by Roberts 1992 for Pakistan or by Bates & Lowther 1952 for Kashmir, but see Ali & Ripley 1973), then northwards to Yunnan and Sichuan (Cheng 1987), and southwards to Indochina, but apparently only in isolated mountainous areas. Mt. Victoria in the Chin Hills of Myanmar, northern parts of N Vietnam and Langbian Peak in S Vietnam, and Doi Inthanon in NW Thailand are known breeding areas (del Hoyo *et al.* 2006, Dickinson 2003, Lekagul & Round 1991, Ticehurst 1938). V. Vietinghoff-Scheel (1987a) presented a detailed map of the then known area.

Vocalisations: Territorial song is a short warbling, 4–9 note verse mostly of less than 1s long (longer, double-verses up to 1.5s occur). The widespread syntax pattern is of an up to three times repetition of a two-note syllable. Every male exhibits several such verse types and all their notes differ in pitch and frequency range. Irregular verse types occur but are rare (Martens 1980).

Sonagams are figured by Martens (1980) and Rasmussen & Anderton (2005).

The *Phylloscopus* [*proregulus*] superspecies

Allospecies included (4): *P. proregulus* (Pallas, 1827); *P. kansuensis* Meise, 1933; *P. forresti* Rothschild, 1921; *P. chloronotus* (Gray, 1846).

The superspecies consists of the geographic representatives of *P. proregulus* (Pallas, 1827) *sensu*

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lato. Traditionally, *P. proregulus* was subdivided into three (Vaurie 1959, Mayr *et al.* 1986) or four (Ticehurst 1938) subspecies, one in the Siberian taiga (nominate *proregulus*), the rest (at least ssp. *chloronotus* and *simlaensis*) in Sino-Himalaya. Following better knowledge of vocalisations and the onset of molecular genetics several old names sunk into synonymy have had to be revived and are now well-established additional taxa. Presently accepted are *proregulus* Pallas, *kansuensis* Meise, *forresti* Rothschild, *chloronotus* Gray, *simlaensis* Ticehurst, and *yunnanensis* La Touche. They are closely related and on molecular genetic evidence form a monophyletic assemblage (Martens *et al.* 2004), though perhaps with the exception of *yunnanensis* (which see). A name *sichuanensis* Alström, Olsson & Colston, 1992, proposed for an allegedly overlooked species of SW China (Alström *et al.* 1992) turned out to be a junior synonym of *yunnanensis*. The latter lives in sympatry and even in local syntopy with two taxa of the *proregulus* complex.

Approaches basing taxonomic decisions on molecular genetics and vocalisations have recently changed taxonomy considerably. *P. proregulus sensu lato*. The geographical

The *proregulus* assemblage of geographic representatives falls into four haplotype clusters and each of these is matched by at least one distinct song type. Genetic distance values are large and vocalisations, both calls and songs, circumscribe four entities best treated as different biological species within the one [*proregulus*] superspecies (Martens *et al.* 2004). However, this view was only partly accepted by del Hoyo *et al.* (2006). The *proregulus* group (and *P. yunnanensis*) are the smallest-sized *Phylloscopus* species. External morphology is homogeneous and the Sino-Himalayan taxa *kansuensis*, *forresti*, *chloronotus* and *simlaensis* are hardly distinguishable from one another by any obvious measurement, pattern, marking or colour character. Nominate *proregulus*, on the other hand, differs by its larger size and yellowish face, especially the supercilium. For measurements and other morphological indices of several of the allospecies see Martens (2000), Martens & Eck (1995) and Martens *et al.* (2004).

Sokolow & v. Vietinghoff-Scheel (1988) presented a detailed distributional map of

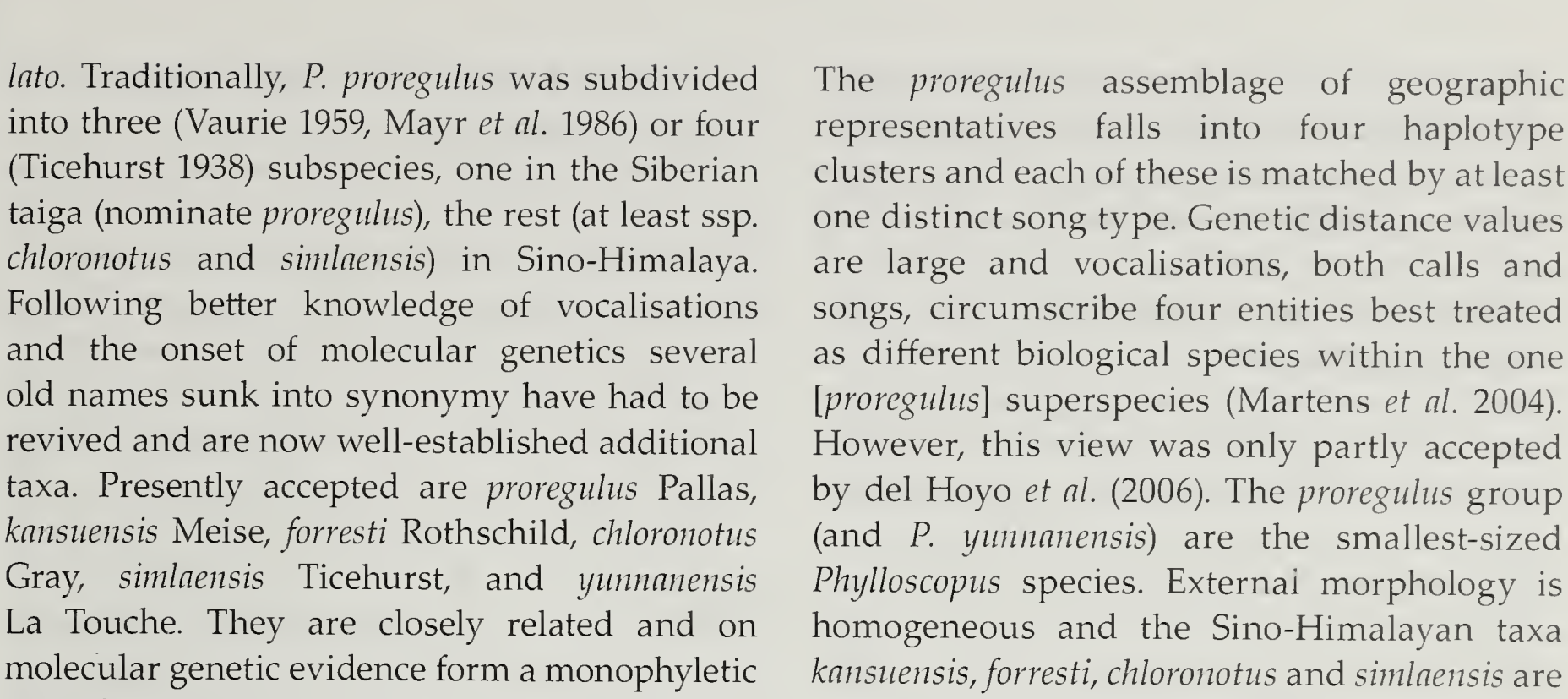

Figure 2. *Phylloscopus* territorial songs and calls:

a) *P. pulcher*: part of an endless-song sequence, Nepal, Myagdi Distr. (first part of trill in reality exceeds 8 kHz);

b) *P. subviridis*: part of an endless-song sequence (trill actually exceeds 8kHz), Afghanistan, Nuristan;

c, d) *P. yunnanensis*: part of an endless-song sequence (c) and call-song (series of calls) (d), China, Taibai Shan, Shaanxi.

(Recordings: (a, c, d) J. Martens; (b) G. Thielcke)

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ranges of nominate *proregulus* and the Sino-Himalayan taxa are disjunct, separated mainly by the forestless and, for arboreal *Phylloscopus* warblers, largely inhospitable deserts of N China. The latter taxa are anticipated to occupy a continuous area with zones of contact, respectively, between *kansuensis* and *forresti* and *forresti* and *chloronotus*. As yet, however, these zones have hardly been searched for and their whereabouts remains little known (see below).

Phylloscopus proregulus (Pallas, 1827) *sensu stricto*

Taxon included (1): *P. proregulus* (Pallas, 1827) [Ingoda River, SE Transbaicalia]. Monotypic.

Taxonomy: After the split of *proregulus* from the geographically disjunct set of Sino-Himalayan taxa, the species is monotypic. Its genetically closest relative (distance value of 3.1% from cytochrome-*b* analysis,) is the NW Chinese *P. kansuensis* from which it is isolated by N Chinese deserts. They differ remarkably in calls and song structure.

General characteristics: This is an inhabitant of coniferous and mixed coniferous/broad-leaved forests, confined to mountains only in the south-eastern part of the range in Korea (and neighbouring China?), otherwise also in lowlands and hilly areas. Its yellowish face is characteristic and easily tells it apart from all Sino-Himalayan taxa of the superspecies.

Distribution: Confined to the taiga belt from the Urals to NE China (Cheng 1987, Sokolow & v. Vietinghoff-Scheel 1988) and Korea (Duckworth 2009, Duckworth & Moores 2008). Migrants on their way to the breeding quarters straggle through China to at least as late as 5 May (S Taibai Shan, Shaanxi; skin MTD Dresden) and may then be found in close proximity to *P. forresti* and *P. yunnanensis*.

Vocalisations (Fig. 3a, 4a–c): Territorial song belongs to the 'endless type'. There are

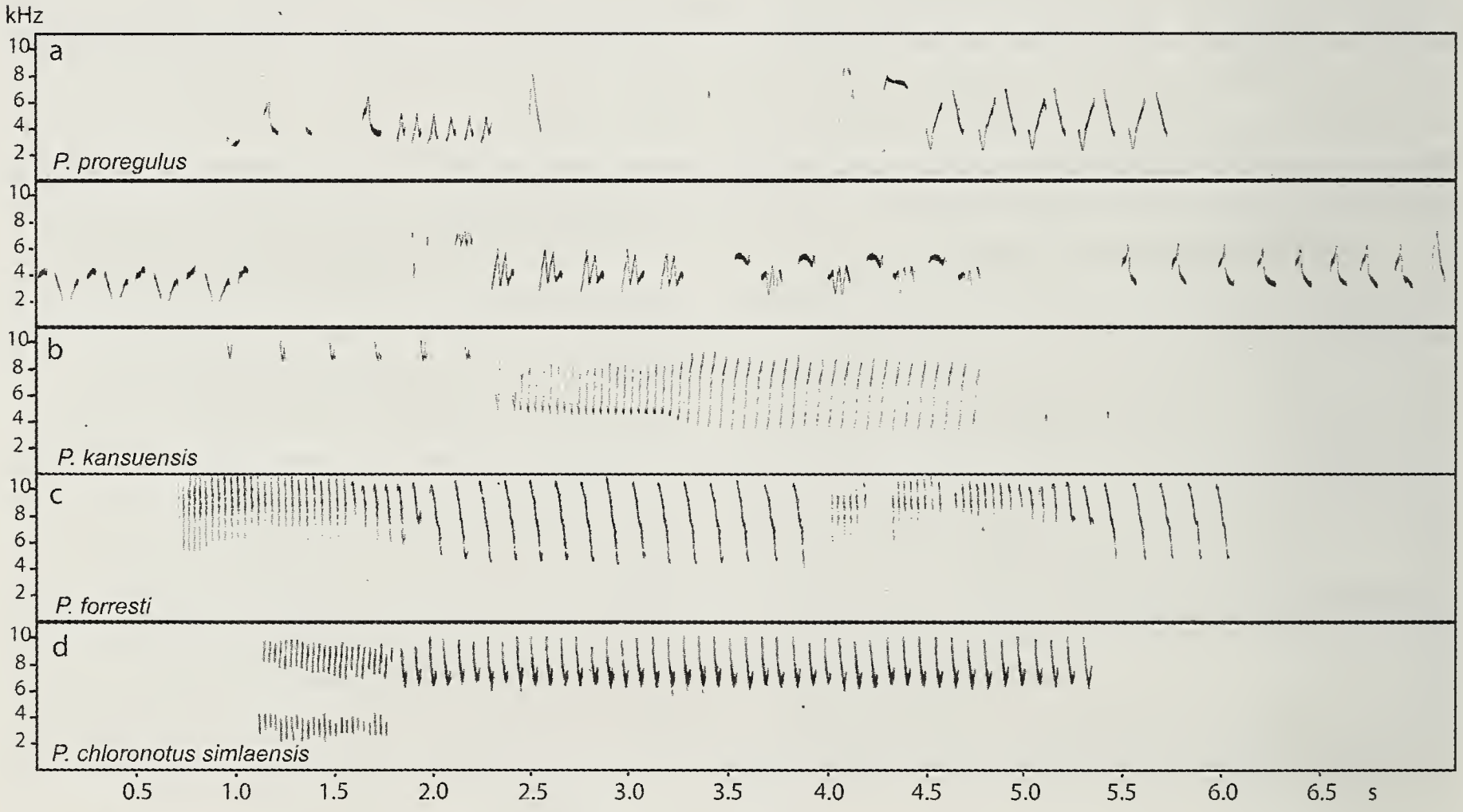

Figure 3. *Phylloscopus* [*proregulus*] superspecies, territorial songs:

a) *P. proregulus sensu stricto*: part of an endless-song sequence, Russia, Bikin, lower course of Ussuri River;

b) *P. kansuensis*: verse-type song, China, Bei Shan, Qinghai;

c) *P. forresti*: verse-type song, China, Taibai Shan, Shaanxi;

d) *P. chloronotus simlaensis*: trill part of an endless-song sequence, Nepal, Dolpa Distr.

(Recordings: J. Martens)

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no clear-cut verses but components of song, mainly trills (sometimes like repeated element-groups), are not distinctly spaced and form a more or less continuous presentation, lasting for minutes and most often from an exposed treetop. Frequency range is large and descends to 2.5 kHz, quite remarkably low for such a small bird (Martens *et al.* 2004, Schubert 1982, Wallschläger 1980). Call is V-shaped, approximately 0.25s long, the longest within the *proregulus* complex, and rich in harmonics. It is most similar to the calls of Chinese *P. forresti* but all members of the *P.* [*proregulus*] superspecies show unmistakable common call characteristics (Fig. 4 in Martens *et al.* 2004).

Sonagrams are published in Brooks (1992), Martens (1998), Martens *et al.* (2004) and Schubert (1982).

Phylloscopus kansuensis Meise, 1933

Taxon included (1): *P. kansuensis* Meise, 1933 [Lauhukou, near Xining, Gansu (in present Qinghai province), China]. Monotypic.

Taxonomy: The taxon was described as a subspecies of *P. proregulus* allegedly from Gansu, but the collection locality, at least as presently understood, is in Qinghai (though close to the Gansu border). Types were based on the Walter Beick collections (Stresemann *et al.* 1937). The taxon was accepted by Ticehurst (1938) who treated it as a form intermediate between nominate *proregulus* and ssp. *chloronotus* (of China), but this was rejected by Vaurie (1954, 1959) and Mayr *et al.* (1986) who found them inseparable. Territorial song and calls have proved to be distinct (Alström *et al.* 1997, Martens 1998, Martens *et al.* 2004) and molecular genetic distance values of the cytochrome-*b* gene are high, ranging between 3.1% from *P. proregulus* and 4.5% from *P. forresti* (Martens *et al.* 2004). These characters led to the conclusion that *kansuensis* has independent species status—accepted by Dickinson (2003) and del Hoyo *et al.* (2006).

General characteristics: For size and wing/tail relations see Martens & Eck (1995), Martens *et al.* (2004).

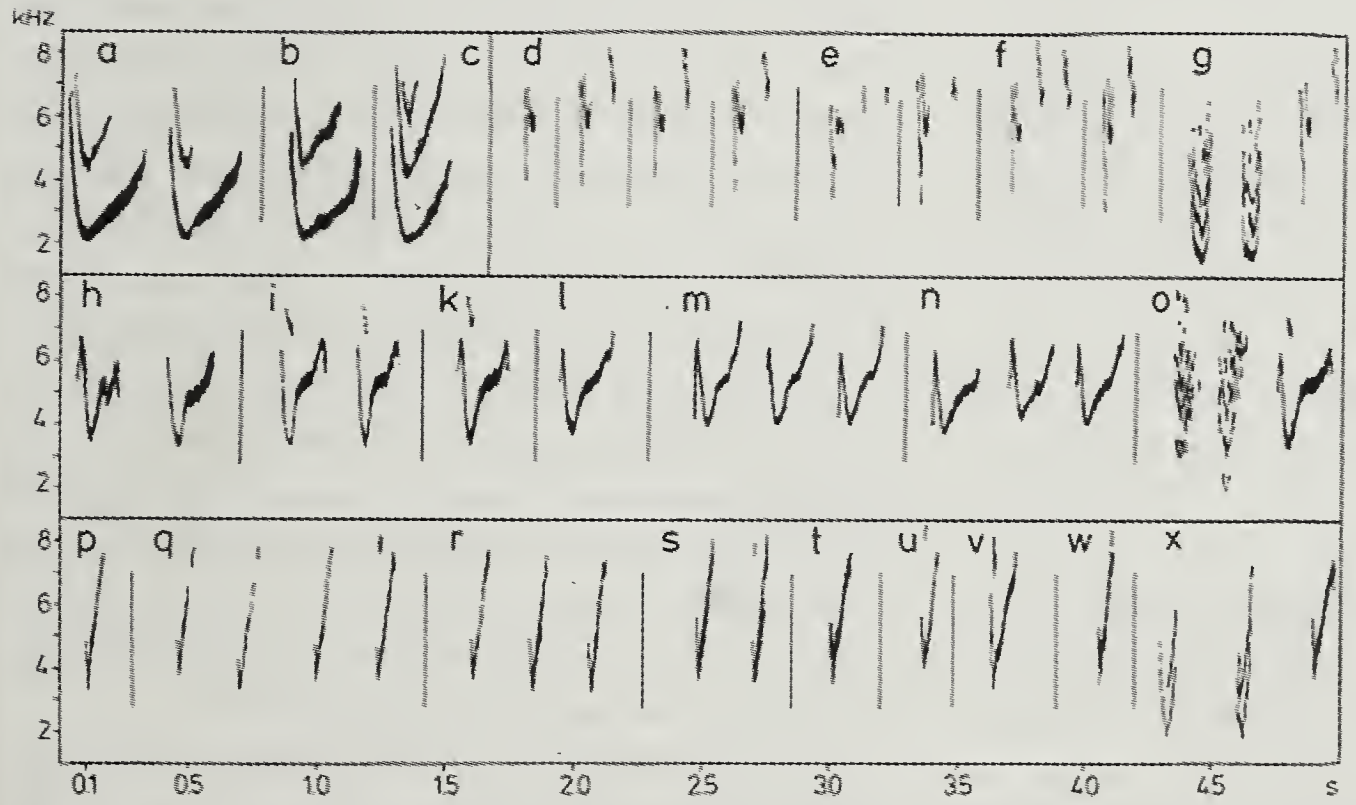

Figure 4. *Phylloscopus* [*proregulus*] superspecies calls (short vertical lines separate individual males):

a–c) *P. proregulus sensu stricto*: Russia, Primorskiy Kray, lower course of Ussuri River;

d–g) *P. kansuensis*: China, Bei Shan, Qinghai;

h–o) *P. forresti*: China, Sichuan: Wawu Shan (h, i, o), Omei Shan (k–n);

t, u, x) *P. chloronotus chloronotus*: Nepal: Ramechap Distr. (t, x), Bhojpur Distr. (u);

p–s, v, w) *P. chloronotus simlaensis*: Nepal, Myagdi Distr. (p– r), Dolpa Distr. (s), Mustang Distr. (v), India, Kashmir (w).

(Recordings: (a) B. Veprintsev; (b-x) J. Martens (modified from Martens *et al.* 2004))

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Distribution: Chinese endemic. Without vocal recognition and/or molecular analysis, locality records remain vague. As only a few records are backed by such data the confirmed area of occurrence is minute--largely S and SW of Lanzhou (e.g., Lianhua Shan; Gansu), N and NE of Xining including Bei Shan (Qinghai) (Alström *et al.* 1997, Martens 1998, Martens *et al.* 2004, Sun *et al.* 2002). The zone of contact with more southerly distributed *P. forresti* occurs in S Gansu. Close to Hezuozhen (34°58'N) and in the Qiagai valley (34°50'N) both species have been found singing side by side in June (author's personal observation together with Jia Chen and Sun Yue-Hua). *P. kansuensis* is locally common in mountainous mixed coniferous/broad-leaved forests from 1700 to 3100 m (Alström *et al.* 1990, Martens *et al.* 2004).

Vocalisations (Fig. 3b, 4d–g): The song is strictly 'verse-type'. The verse is divided into three main parts: (i) a loose trill of V-shaped notes at around 9 kHz and (ii, iii) a double trill, the first part of which is extremely densely packed, the second part slightly more spaced. The large frequency span ranges up from slightly below 3 kHz to 9 kHz. Pitch of the individual trill note in the verse always ascends (but see *P. forresti*, below) (Alström *et al.* 1997, Martens 1998, Martens *et al.* 2004). The call is composed of two extremely short notes of broad frequency range, the second featuring at least the remains of the V-type typical of all *P.* [*proregulus*] allospecies.

Sonagrams are figured in Alström *et al.* (1997), Martens (1998), Martens *et al.* (2004), and Sun *et al.* (2002).

Phylloscopus forresti Rothschild, 1921

Taxon included (1): *P. forresti* Rothschild, 1921 [Likiang (= Lichiang or Lijiang), Yunnan, China]. Monotypic.

Taxonomy: The taxon *forresti* was described from the Lijiang Range in NW Yunnan as a subspecies of *P. proregulus*. Except for Hartert & Steinbacher (1934), subsequent authors put it either in the synonymy of nominate *proregulus* (Ticehurst 1938, Vaurie 1954) or treated it as a subspecies of *P. chloronotus* (del Hoyo *et al.* 2006). Molecular genetic analysis of a Sichuan *'chloronotus'* population (from Emei Shan, relatively near to the Lijiang Range) revealed strong differences from both N Chinese *kansuensis* and Himalayan *chloronotus*: mitochondrial cytochrome-*b* distance values respectively 4.5% and 4.2% (Martens *et al.* 2004). Also, territorial songs from Emei Shan strongly differ from northern *kansuensis* and Himalayan *chloronotus*, but agree well with those from the Lijiang Range, the type locality of *forresti*. Referring to these circumstances Martens *et al.* (2004) assumed that the name *forresti* Rothschild could be extended to this other, Sichuan population of the *proregulus* complex. However, that has not yet been substantiated by re-examination or genotyping of the type specimen (housed in NHM Tring; LeCroy & Dickinson 2001).

General characteristics (Plate 1a–b): The only unanimously agreed features differentiating *P. forresti* are voice, good for field identification, and cytochrome-*b* genotyping to correctly identify museum specimens.

Distribution: Chinese endemic. Records are from NW Yunnan (voice recording on the Lijiang Range: Alström & Olsson 1990); Sichuan (voice recording and genetics from Emei Shan and voice recording from Longxi-Honkou Reservation and Wawu Shan: Martens *et al.* 2004) and Shaanxi (voice recording and genetics from the Qin Ling Range, Taibai Shan and voice recording from Huayang, Qangqing Panda Reservation: author's unpublished data, Martens *et al.* 2004). The species is probably widespread at least in Sichuan, but is rare in Shaanxi and to be accepted records need to be verified by vocal recordings and/or molecular genetics. Contact with *P. kansuensis* occurs to the north (see above) and with *P. chloronotus* to the southwest, but the latter zone has not yet been localized.

Vocalisation (Fig. 3c, 4h–o): Territorial song is of two types. The 'endless type', which is the more common one, combines groups of single notes (sometimes of note-pairs) repeated in trills resulting in a loose, homogeneous delivery, from low trees or from the upper canopy of conifers. This is song-type 'B' as defined by Alström & Olsson (1990). The second song form is 'verse-type' consisting of two trill parts, one

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of which is extremely dense (narrowly spaced) as in *P. kansuensis*, the second noticeable more openly spaced, similar to the endless-song type. This is song-type 'A' as defined by Alström & Olsson (1990). The verse type strongly resembles the song of *P. kansuensis* but in *P. forresti* all notes fall in frequency whereas they ascend in *kansuensis*—in terms of vocal recognition a remarkable difference between two related *Phylloscopus* species. The call note is V-shaped and most similar in shape to that of northern *P. proregulus*, but only about half the latter's length, approximately 0.12s long (Martens *et al.* 2004).

Sonagrams are figured in Alström & Olsson (1990), Martens (1998) and Martens *et al.* (2004).

Phylloscopus chloronotus Gray, 1846

Taxa included (2): *P. c. simlaensis* Ticehurst, 1920 [Simla, NW Himalayas, India]; *P. c. chloronotus* Gray, 1846 ['Nepal'].

Taxonomy: Pallas's Warbler of the Himalayas constitutes a distinct cytochrome-*b* haplotype cluster with high distance values (4.2% to 4.6%) from all other representatives of the *proregulus* complex (4.2% from neighbouring *forresti*). Song is of the 'endless-song' type but in many details differs from that found in *P. proregulus* and *P. forresti*. Genetic and acoustical differences are marked and lead to the conclusion that both qualify this Himalayan representative of the *proregulus* complex for species rank (Martens *et al.* 2004). Two subspecies are recognized, *simlaensis* from the NW Himalayas and nominate *chloronotus* from the remainder of the Himalayas. Morphological differences between them are slight and concern the coloration of the upperparts, but they are constant (Martens & Eck 1995, Martens *et al.* 2004).

General characteristics: The only features differentiating *P. chloronotus* unambiguously are voice, recordings being good for field identification, and cytochrome-*b* genotyping to correctly identify museum specimens.

Distribution: Widespread in the Himalayas, from Pakistan (Ali & Ripley 1973, Roberts 1992), Kashmir (Bates & Lowther 1952), Himachal Pradesh (tape recording by P. Singh), and Nepal (tape recordings from Dolpa District and genetic analysis from various parts of W, central and E Nepal: Martens & Eck 1995, Martens *et al.* 2004). Genetic characters and song types of the populations from Sikkim (Ali 1962) and further east in the Himalayas remain unknown. The presumed contact zone between *P. chloronotus* and *P. forresti* is likely to occur in the easternmost Himalayas or SW Yunnan.

Vocalisations (Fig. 3d, 4p–x): Territorial song belongs to the 'endless-song' type. It consists of a loose arrangement of trills repeating one note, sometimes a note-pair. Trills vary in density (= note spacing) but are always slightly more dense than those of *P. forresti*, less so than in *P. kansuensis* and in the verse-type song (type 'A' song) of *P. forresti*. Song recordings from Nepal and Himachal Pradesh are alike (Martens *et al.* 2004). Calls in *P. chloronotus* are V-shaped but at slightly less than 0.1 s are at the short end of the duration spectrum in the *proregulus* complex. Apparently, they do not differ between the two subspecies, nominate *chloronotus* and ssp. *simlaensis*.

Sonagrams are figured by Martens (1980, 1998), Martens *et al.* (2004) and Rasmussen & Anderton (2005).

Phylloscopus yunnanensis La Touche, 1922

Taxon included (1): *P. yunnanensis* La Touche, 1922 [Mengtz, Yunnan, China] (syn. *P. sichuanensis* Alström, Olsson & Colston, 1992). Monotypic.

Taxonomy: This taxon has a complex history. Originally, *yunnanensis* was described by La Touche (1922a) as a subspecies of *P. proregulus* and, later, he very ingeniously upgraded it to species rank (La Touche 1925). Hartert & Steinbacher (1932–1938) mentioned La Touche's opinion but did not comment on it. Ticehurst (1938) who examined four of the 'co-types' synonymised *yunnanensis* with *P. proregulus 'chloronotus'* (from China). He found them to be inseparable and argued that the character explicitly mentioned by La Touche (1922) as separating *yunnanensis* had proved not to be correct—'the presence or absence of the dusky spot on the wing below the lower bar is purely an individual variation'—(see below). Apparently acting upon this statement Vaurie (1954, 1959) made no mention of this

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taxon at all and, subsequently, it was simply forgotten and lost. Decades later, Alström *et al.* (1990) discovered an acoustically prominent representative of the *proregulus* complex in mountainous areas of SW China and described it as a new species, *Phylloscopus sichuanensis* Alström, Olsson & Colston, 1992. They chose as type a specimen (Shanxi, 18 May 1962) from the IZAS collection, Beijing, of which neither a voice recording nor a tissue sample was available, a flaw in so taxonomically difficult a group of passerines as this. Alström *et al.* (1992) indeed mentioned the taxon *yunnanensis* but did not check the type material personally, relying instead on information from the responsible curator. S. Eck investigated a *yunnanensis* 'co-type' (AMNH 450048) and found it perfectly matched the coloration and measurements of the newly described *P. sichuanensis*. The holotype of *yunnanensis*, brought from MCZ Cambridge to AMNH, was compared by J. Haffer with the AMNH type and photographs of newly collected specimens of *sichuanensis* from Shaanxi. The types fully matched one another, the illustrations in Alström *et al.* (1992) and newly collected skins connected to voice recordings. Martens & Eck (1995: 249) had already at least tentatively treated *sichuanensis* as a junior synonym of *yunnanensis*.

Additional studies, including molecular genetic analyses, have affirmed the independent species status of *P. yunnanensis*. It occurs syntopically with at least two members of the *P.* [*proregulus*] superspecies and also has a distinct voice. Cytochrome-*b* distance values from various *P.* [*proregulus*] taxa amount to 7.5–8.4% (Martens *et al.* 2004). Their probable closest relative in common is *P. subviridis* but the latter is likely to be closer to the *P. proregulus* complex than to *P. yunnanensis* (Johansson *et al.* 2007).

General characteristics (Plate 1c–e): In its small size this species resembles the Sino-Himalayan allospecies of *P.* [*proregulus*], and main coloration and pattern characters are also similar. A key identification feature already mentioned by La Touche (1922a, 1925) is the lack of a blackish shadow on the secondaries below the wing bar. Eck & Martens (1995) checked 113 *chloronotus* specimens for this character and found it failed in only two cases, demonstrating (*contra* Ticehurst 1938) that it is not randomly distributed. The sides of the crown are slightly paler than in *chloronotus*, the median crown-stripe usually more indistinct anteriorly, maybe even very faint except on the rear crown, and the stripe through the eye is slightly less dark (Alström *et al.* 1992). For measurements and wing/tail indices see Martens (2000a). Bi *et al.* (2003) presented observations on the incubating behaviour of a population in southern Gansu.

Distribution: Chinese endemic. It spans an extensive area through (parts of) the provinces Sichuan, Gansu, Shaanxi, Shanxi and Hebei (Alström *et al.* 1992, Martens 2000a); recently also found in Hubei province (MTD Dresden skin dated 31 May 2008 from Zhashuping, 1700 m altitude, at 30°48'N:109°58'E). It is not known if the area around Mengtz in S Yunnan, where La Touche's specimens were collected, constitutes breeding range or if La Touche had migrants in his hands. His collecting dates in April and October at least qualify for migrants and, as yet, breeding in Yunnan is unproven.

Vocalisations (Fig. 2c–d): Territorial song unmistakable, and two types are to be distinguished. The first is delivered from the exposed top of a large bush or tall isolated tree. This is an extremely monotonous and stereotyped, machine-like form of 'endless song', lasting for minutes. The second song type includes shorter or longer sequences of variously melodious to hard metallic notes, individual or repeated, always given in bush cover or from the lower canopy (Alström *et al.* 1992, Martens 1998, Martens *et al.* 2004). Isolated notes of this second song form may qualify as 'calls'. The endless song form is supposed to be limited to males, but attribution of the second song form is unknown. Individual birds, assumed to be males, may give both song forms within the space of a few seconds (author's personal observation). Li *et al.* (2008) found the endless-type song of birds from high altitude lower in frequency than that from the lower part of the altitudinal occupation zone. Geographical variation of notes seems to be absent. There are no similar song types in the allospecies of the *P.*

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[*proregulus*] superspecies, of which *P. kansuensis* and *P. forresti* are locally sympatric, and even syntopic, with *yunnanensis*.

Sonagrams are figured in Alström *et al.* (1990, 1992), Li *et al.* 2008, Martens (1998), Martens *et al.* (2004) and Rasmussen & Anderton (2005).

***Phylloscopus subviridis* (W.E. Brooks, 1872)**

Taxon included (1): *P. subviridis* (W.E. Brooks, 1872) [Etawah, United Provinces (=Uttar Pradesh), India]. Monotypic.

Taxonomy: No adherent problems. From molecular genetic analyses Johansson *et al.* (2007) found *subviridis* closely related to the *P.* [*proregulus*] complex and to *P. yunnanensis*, but in exactly what position could not be determined, though being probably closer to the *P.* [*proregulus*] complex.

General characteristics: This is a little-known species. For the last couple of years, its breeding areas have been nearly impossible to reach due to local war and tribal conflicts. Paludan (1959) and Löhrl & Thielcke (1969) described its breeding grounds and voice in Nuristan, E Afghanistan.

Distribution: The area is minute, confined to the westernmost Himalayas (Ali & Ripley 1973, Roberts 1992) and a few outlying mountains in Afghanistan (Paludan 1959). V. Vietinghoff-Scheel (1986b) was able to locate only four definite breeding-season localities. This is one of the few *Phylloscopus* species endemic to the W Himalayan area and may have originated there.

Vocalisations (Fig. 2b): Territorial song is of the 'endless type', with no defined verses but a loose succession of three qualitatively different song parts, irregularly combined. These are: (i) high-pitched, densely packed, monotonous trills ranging from about 4 kHz to slightly above 8 kHz (trills of very similar quality also occur in *P. pulcher*), individual notes falling in pitch extremely rapidly; (ii) with notes, mostly of a deeply cut V shape, grouped in short rows that give a rattling auditory impression, two or three different such groups being integrated into the song; (iii) short, high-frequency whistles at around 8 kHz interspersed between song parts (i) and (ii) (Martens 1980).

Sonagrams are figured in Löhrl & Thielcke (1969), Martens (1980), and Rasmussen & Anderton (2005).

The *Phylloscopus inornatus* complex

In the past, Hume's Warbler was generally treated as a polytypic species with three subspecies (Vaurie 1959, Mayr *et al.* 1986) distributed in the Siberian taiga, the central Asian mountains from the Altai south to the Pamir Range and W Himalayas, and in a small, disjunct part of W China. Marked differences in territorial song between SW and N taiga populations referring, respectively, to ssp. *humei* and nominate *inornatus* were described and figured first by Schubert (1982, partly only calls).

The sympatric occurrence of *inornatus* and *humei* in a part of SW Siberia was summarized from various Russian sources by Chrabryj *et al.* (1989b), supporting the possible full biological species status of these taxa. Later, BOURC (1997 and references cited therein) proposed this upgrade formally. Further evidence of species status resulted from a molecular genetic study which indicated a deep split of the cytochrome-*b* gene between *inornatus* and *humei/mandellii* but much less of a split between the latter two taxa. In addition, voice playback experiments confirmed the significance of the impressions of difference between the main acoustic groups (Irwin *et al.* 2001a). Studying a large amount of skin material from various parts of Siberia, Red'kin & Konovalova (2004) fixed the co-occurrence of nominate *inornatus* and ssp. *humei* in more detail, including a large area between roughly Krasnoyarsk, the Sayan Mts and the Altai. But they also found specimens that, in their opinion, showed signs of hybridisation. Fourteen such specimens were discussed in detail, from which they concluded that the geographical forms were better treated as one species only. Acoustic and genetic parameters were not considered and, here, *inornatus* and *humei* are treated as separate species, with *mandellii* from SW China retained

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as a subspecies of *P. humei*. Molecular genetic results also reveal the *P. inornatus* complex as sister to *P.* [*proregulus*] and *P. yunnanensis*, possibly also closely related to *P. subviridus* (Johansson *et al.* 2007).

Phylloscopus inornatus (Blyth, 1842) *sensu stricto*

Taxon included (1): *P. inornatus* (Blyth, 1842) [near Calcutta, India]. Monotypic.

Taxonomy: See above. *P. inornatus sensu stricto* is a sister species of *P. humei*. Extremely different songs, marked genetic differences and extended sympatric occurrence provide clear evidence for species status. Limited hybridisation with *P. humei* apparently occurs but has been described only from skins (Red'kin & Konovalova 2004).

General characteristics: *P. inornatus* and *P. humei* are well separable on external characters. The former is fairly bright green with two marked, yellowish wing bars and large white tertial tips; the latter is more drab, its wing bars buff, the upper one inconspicuous, and tertial tips are less distinct (Rasmussen & Anderton 2005).

Distribution: Mainly E Siberia, in the north westwards to the Urals (Chrabryj *et al.* 1989b) and eastwards into our area in NE China (Nei Mongol, Heilongjiang, Hebei) (Cheng 1987); strictly disjunct from SW Chinese *P. humei mandellii*. For the Siberian area of overlap with *P. humei humei*, see above. This area includes parts of the central Altai, where both species have been found singing (Ernst 1996).

Vocalisations: Territorial song is a short warble of up to five notes, parts of which are drawn out into long, descending or ascending whistles. As can be seen from published sonagrams, song appears quite stereotyped, with little variation of verses in the individual repertoire, or between males from distant range parts.

Sonagrams are figured by Bergmann *et al.* (2008), Brooks (1992), Ernst (1996), Glutz v. Blotzheim & Bauer (1991), and Rasmussen & Anderton (2005).

Phylloscopus humei (W.E. Brooks, 1878)

Taxa included (2): *P. h. humei* (W.E. Brooks, 1878) [NW India]; *P. h. mandellii* (W.E. Brooks, 1880) [Darjeeling, Sikkim (=Bengal), India].

Taxonomy: For reasons to separate *humei/mandellii* from *inornatus* specifically see above. The plea has been made to split *mandellii* specifically from *humei* (Irwin *et al.* 2001a, Rasmussen & Anderton 2005). But territorial song ('tseee') and a double call (see below) do not seem to differ to any significant extent between taxa, and molecular genetic results, too, place *mandellii* close to *humei*.

General characteristics: Lucid accounts of *humei* breeding biology in Kashmir and Gansu, China, were presented respectively by Price & Jamdar (1991a) and Bi *et al.* (2009).

Distribution: The species occupies a bipartite range. Nominate *humei* lives in SW Siberia from the Sayan Mts. on the upper Yenisey River south-westward to the Altai (3 localities, backed by sonagrams, given in Ernst 1996) and the Pamir to NW China (Xinjiang) and the NW Himalayas (e.g., Ali & Ripley 1973, Bates & Lowther 1952, Cheng 1987, Roberts 1992) south-eastwards to the Kali Gandaki valley in dry, monsoon-protected NW Nepal (Martens 1972, Martens & Eck 1995). The central and eastern Himalayas are unoccupied (but note that the type locality of *mandellii* is 'Sikkim'). Ssp. *mandellii* has an extended range in SW and NW China, from Nei Mongol/Ningxia to Shaanxi (Taibai Shan), Shanxi, Gansu, Qinghai, Sichuan and Yunnan (Cheng 1987) where it is locally common. Apparently, it is not in the E Himalayas, but its SW limit in Yunnan is unrecorded.

Vocalisations: Territorial song is distinct from that of *P. inornatus* and is one strong argument for splitting them specifically. *P. humei* song is the least complicated of all *Phylloscopus* species: a loose, irregular, therefore 'endless' aggregation of two types of notes. The first is an extremely modulated, slightly descending, sharp 'tseee' call ('Klirrlaut' in Martens 1980, 'Langlaut' in Schubert 1982) about 1s in length. The second type is a double note, a sharp 'tsip tsip'. They intersperse, but are given in no regular order. Bergmann (2008), who described the 'tseee' call in more detail in the Tien

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Shan (Alatau, Kazakhstan), noted a seasonal differentiation: 'tseee' notes were commonly used at the beginning of the breeding period and the double-note call prevailed later in this period. The single-note type seems to be near-identical from male to male, individually varied only by slight, difficult-to-describe modulations. The double-note type is clearly individual-specific; every male produces its own invariate version. Simple call notes are similar to those of the double call but never identical. They are individual-specific but still extremely similar from male to male, including across distant populations (Martens 1980). According to the sonagrams in Irwin *et al.* (2001a) vocalisations of *humei* and *mandellii* are of the same type, very similar and possibly even identical.

Sonagrams are figured in Bergmann (2008), Bergmann *et al.* (2008), Brooks (1992), Glutz v. Blotzheim & Bauer (1991), Martens (1980), Rasmussen & Anderton (2005), and Schubert (1982).

The *Phylloscopus* [*borealis*] superspecies

Allospecies included (3): *P. borealis* (J. H. Blasius, 1858) *sensu stricto*; *P. examinandus* Stresemann, 1913; *P. xanthodryas* (Swinhoe, 1863).

The Arctic Warbler has suffered a complex taxonomic history and no classification unanimously agreed among scholars has yet been arrived at. There are still some major obstacles. This warbler occupies one of the largest breeding areas of all *Phylloscopus* species, ranging from northern Europe across the Siberian taiga belt to parts of Mongolia, all Japan and even Alaska (Fig. 5). Such a distributional pattern poses major zoogeographical and evolutionary questions, variously interpreted. Portenko (1938) and Vaurie (1954) pointed to the fact that plumage coloration in *P. borealis* is subject to rapid post-mortem change. This undermines taxonomy based on colour characteristics alone. In addition, the types of several current taxon names were collected as passage migrants or winterers. Two of these from the area of modern Xiamen, Fujian province, have still not reliably been assigned to a breeding population, but a kind of taxon convention has been established (i.e., *xanthodryas*, *hylebata* or *examinandus*).

Such a lack of sound taxonomy has hindered progress to the extent that recent studies named identical populations differently (Reeves *et al.* 2008, Saitoh *et al.* 2006, 2010), and problems re-surfaced when molecular genetic analyses came to support a splitting of *P. borealis* into multiple evolutionary units. That the Arctic Warbler may have undergone a complicated evolutionary history is also revealed by the discovery of consistently distinct song types

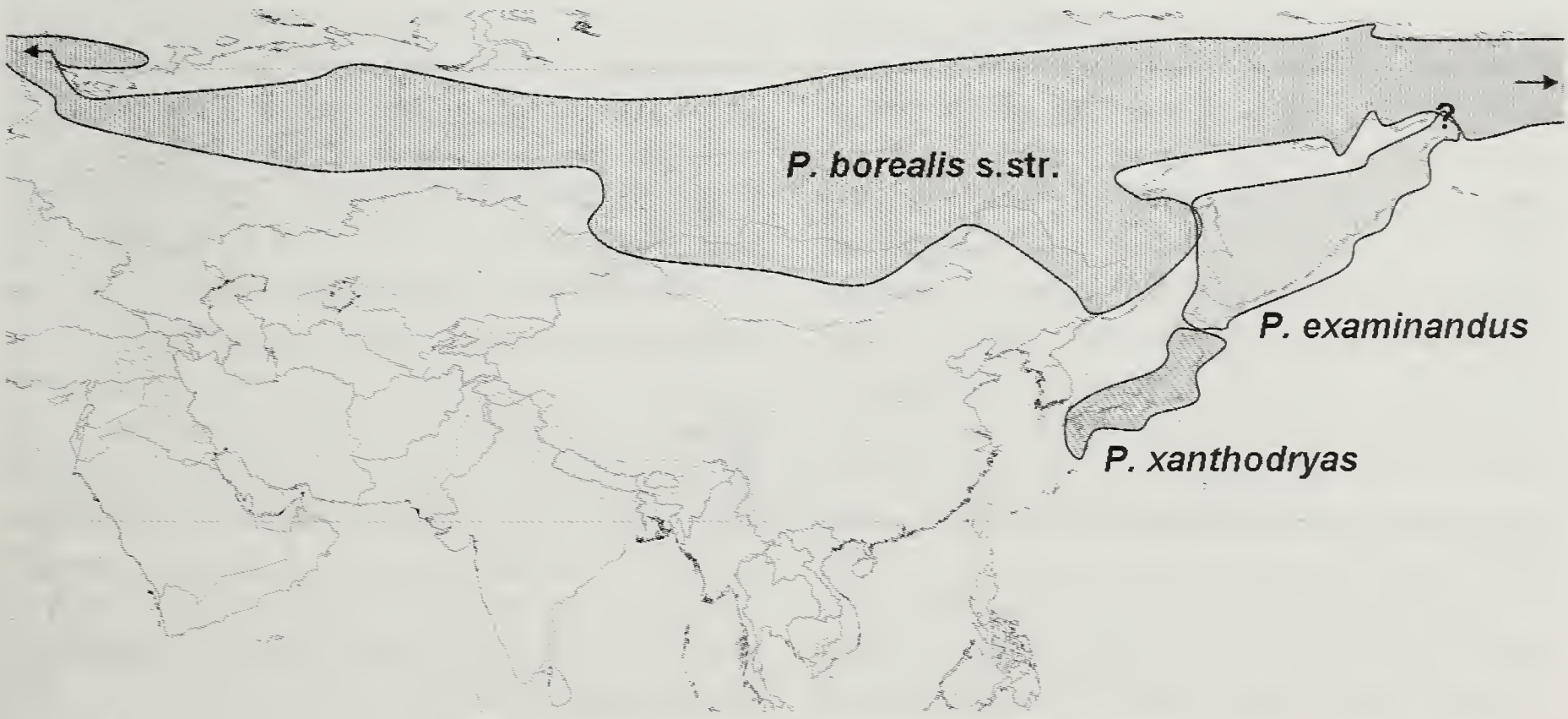

Figure 5. Distribution of the *Phylloscopus* [*borealis*] superspecies including allospecies *P. borealis sensu stricto*, *P. examinandus* and *P. xanthodryas*. (From multiple sources).

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in different parts of its range (Martens 1980, Matsuda 2002, Mauersberger 1980; Fig. 6).

The *P. borealis* revision of Portenko (1938), which Ticehurst (1938) was unable to incorporate in his review, much influenced later taxonomic work. Portenko described two new subspecies, *talovka* and *transbaicalica*, revived *hylebata*, and synonymised Alaskan *kennicotti* with nominate *borealis* and *examinandus* with *xanthodryas*. Vaurie (1954, although hesitatingly in 1959) and Mayr *et al.* (1986) accepted these results but maintained *kennicotti* upon examination of newly-collected material, as did Dementiev & Gladkov (1968). Williamson (1967) and Stepanyan (1990, 2003) drew back and synonymised *hylebata*, *transbaicalica* and *talovka* with nominate *borealis*—in E Asia maintaining only far-eastern *xanthodryas*, replaced north and west by nominate *borealis*.

Such a narrow subspecific arrangement, on the other hand, does not meet with evolutionary expectations. All current trans-Palaearctic and Nearctic breeding populations winter in tropical East and Southeast Asia (Brooks 1992, del Hoyo *et al.* 2006), hence the species may have evolved in the E Palaearctic and all European, W Asian and N American populations may have originated there. E Asia is consequently the place to look for cryptic diversity in *P. borealis*. Saitoh *et al.* (2006, 2008, 2010) discovered deep molecular phylogenetic splits in E Asian populations and distinguished three main clades (though mentioning four in their 2006 poster abstract, the tree topology given in the poster print clearly indicates only three). The first one comprised samples from Alaska (ssp. *kennicotti*), and Anadyr and Magadan in far-E Siberia (nominate *borealis*). The second one is represented by birds from Kamchatka, Sakhalin Island and N Hokkaido (ssp. *examinandus*), and the third by samples from the Japanese islands of Honshu, Shikoku and Kyushu (ssp. *xanthodryas*). Saitoh *et al.* (2010) state that these three main clades differ by 3.8–5.1 % (*p*-distances uncorrected) in the cytochrome-*b* gene (but see below for differing values). This range points to long-separated evolutionary histories, probably in or close to their present E Asian distributional areas (Saitoh *et al.* 2006, 2010). Saitoh *et al.* (2006, 2008) proposed full species status but in their 2010 paper they return to subspecies rank. Principal components analysis revealed these clades as corresponding to and strongly supported by morphological differences (Saitoh *et al.* 2008), also with obvious differences in territorial song (Brooks 1992, Martens 1980, Matsuda 2002, Mauersberger 1980, Saitoh *et al.* 2006).

The Saitoh *et al.* results were corroborated in part by Reeves *et al.* (2008). Their study included material from major parts of the N Palaearctic and Alaska, but missed Japan. A 3.8% corrected ND2-gene distance value of their 'Pacific clade', namely from Sakhalin Island and Kamchatka, from parts of the E and all W Palaearctic birds inspired them to raise this population block to species rank, as *P. xanthodryas*, and they united all other Palaearctic populations under one different species name, *P. borealis* (*sensu stricto*). Strangely enough, both the Saitoh and Reeves teams distinguished a species '*P. xanthodryas*', but applied the name to different populations: those of the Japanese islands excluding Hokkaido according to Saitoh *et al.* (2006, 2008); of Kamchatka and Sakhalin, with no mention of Japan at all, according to Reeves *et al.* (2008). Though many traits have still to be elucidated, I consider subdivision of *P. borealis* into the three species raised by Saitoh *et al.* (2006, 2008) to be plausible. Here, *P. borealis* is treated as a superspecies, details of which are given under the species accounts. The cytochrome-*b* gene distance value between *P. borealis* and *P. examinandus* lineages is 4.06%, that between *P. borealis* and *P. xanthodryas* is 4.69% and that between *P. examinandus* and *P. xanthodryas* 5.23 % (Saitoh *et al.* 2006). Their fourth clade, not mentioned further, differs by 2.3%. Among subspecies proposed, assignment of *hylebata* is not yet resolved. Here, it is attached to *P. borealis sensu stricto* on the basis of song recordings from the middle course of the Ussuri River, Russian Far-East, which match the trans-Palaearctic song type of *P. borealis* (Fig. 6a). Chrabryj *et al.* (1991) outlined the Palaearctic range of the superspecies.

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Phylloscopus borealis (J. H. Blasius, 1858) *sensu stricto*

Taxa included (5), probably all EL as breeders: *P. b. borealis* (J. H. Blasius, 1858) [Sea of Okhotsk, lat. 59°38'N:147°30'E, Siberia, Russia]; *P. b. talovka* Portenko, 1938 [headwaters of the Sertynya River, N Urals, Russia]; *P. b. transbaicalicus* Portenko, 1938 [Borzya, SE Transbaikalia, Siberia, Russia]; *P. b. hylebata* Swinhoe, 1861 [Amoy (Hsia-men = Xiamen), Fujian, China]; *P. b. kennikotti* (Baird, 1869) [St. Michael, Norton Sound, Alaska, USA].

Taxonomy: Over time, the subspecies listed above have suffered various fates. In Dickinson (2003) only one, nominate *borealis*, was accepted. The work especially of Saitoh *et al.* (2008) sought to avoid hasty synonymising of apparently little-differentiated subspecies on the basis that gene-bound diversity, not readily perceptible in external morphology, might prove to be unexpectedly high, as now has turned out to be the case. Except for *hylebata*, samples of all of the subspecies listed were analysed genetically by Saitoh *et al.* (2006, 2010) and/or Reeves *et al.* (2008). All belong to one monophyletic molecular genetic cluster, with high distance value to the nearest neighbouring clade (see above). Saitoh *et al.* (2006, 2010) are followed here in splitting from *P. borealis* the populations of Japan (see below). The Reeves *et al.* paper presents a nice molecular-based view of micro-evolutionary traits in a part of the *borealis* range, namely Beringia, i.e., easternmost Siberia and Alaska and the surrounding large islands. Isolated either side of the Bering Strait for a certain period of time during the last glaciation, partly by insurmountable mountain ranges and/or the Lena-Kolyma barrier, relatively small populations are said to have undergone separate evolutionary histories or to have developed in and spread only recently over parts of Beringia. However, none of the outcomes detected by the authors appears to have taxonomic relevance.

General characteristics: A canonical discriminant analysis based on measurements of wing length, tarsus length, head length and length of wing tip separated *P. borealis sensu stricto* (defined as a molecular genetic clade based on E Siberian and Alaskan specimens) without overlap from Japanese *P. xanthodryas*, but with slight overlap (involving several individuals) from *P. examinandus* (Saitoh *et al.* 2008).

Distribution: From northern Europe across the taiga belt to the Pacific coast and to Alaska, probably also in the lower Amur and Ussuri catchment areas (ssp. *hylebata*, see below).

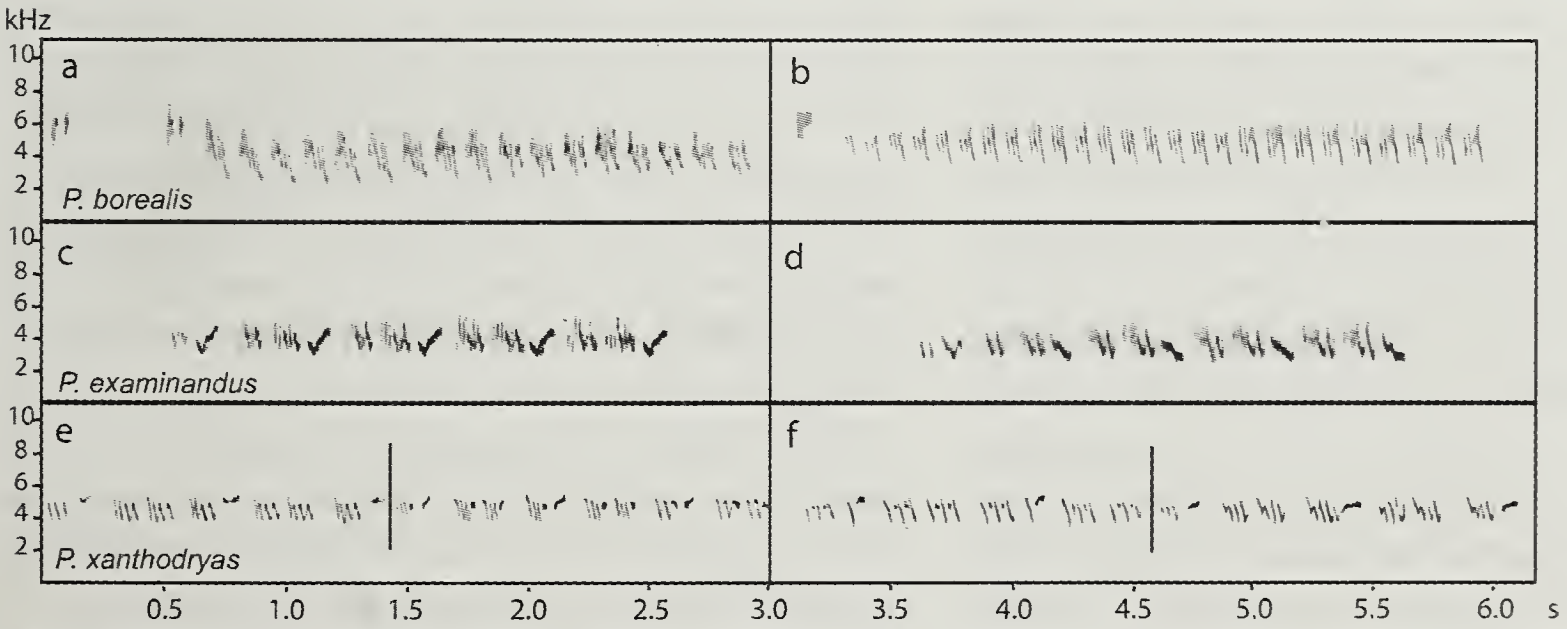

Figure 6. *Phylloscopus* territorial songs:

a, b) *P. borealis sensu stricto*: *P. borealis hylebata*, Russia, Primorskiy Kray, middle course of Ussuri River (a). *P. borealis talovka*, Finland, (b);

c, d) *P. examinandus*: Russia, Petropavlovsk-Kamchatskij, Kamchatka (from one male);

e, f) *P. xanthodryas*: Japan (from two males).

(Recordings: (a) M. Päckert; (b) commercial disc; (c, d) B. Veprintsev; (e, f) commercial disc).

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Vocalisations (Fig. 6a–b): Sonagrams of territorial song have been published from the populations of Norway, Sweden, Finland, the Krasnoyarsk region of Siberia, Lake Baikal and Mongolia, also from the Ussuri River. In all of these, verse pattern is extremely homogeneous: a stereotype repetition up to 26 times of blocks (syllables) of 2–3 (rarely up to 5) steeply descending notes covering a large frequency range; the whole verse up to 3s long.

Sonagrams are figured in Bergman *et al.* (2008), Brooks (1992), Martens (1980), Matsuda (2002), Mauersberger (1980), and Schubert (1982).

***Phylloscopus examinandus* Stresemann, 1913**

Taxon included (1): *P. examinandus* Stresemann, 1913 [Bali, Indonesia]. Monotypic.

Taxonomy: The type material originated from birds in their winter quarters in the Sunda Islands, consequently of unknown breeding-area origin. The name *examinandus* as used here denotes populations from Hokkoido, the Kurile Islands, Sakhalin and Kamchatka. This is in part accordance with Yamashina (1931) who associated the taxon *examinandus* with breeding populations of the northern coast of the sea of Okhotsk, the Kamchatka peninsula and the northern Kurile island Paramushiro. Ticehurst (1938) followed this logic but, as with Lobkov (1997), in Kamchatka north only to Klutschi, latitude 56°N, and he excluded the Okhotsk Sea coast-lands. This latter area is the type locality of nominate *borealis* hence denomination of *examinandus* there does not hold. For Kamchatka populations, various other authors (e.g., Dementiev & Gladkov 1968, c.f. Hartert & Steinbacher 1934) have also used the names *examinandus* and *xanthodryas*. Portenko (1938), and Vaurie (1954, 1959), synonymised *examinandus* with *xanthodryas* from Japan based on the long-winged *examinandus* type specimen, but from the viewpoint of molecular genetics (for cytochrome-*b* distance values see above) that, too, does not apply. Birds from Kamchatka, Sakhalin and N Hokkaido represent a distinct haplotype cluster and thus cannot be united under a common name *xanthodryas* (which see below). Based on molecular genetic results and vocalisations, respectively, Matsuda (2002) and Saitoh *et al.* (2006, 2008, 2010) reserved the name *examinandus* for birds of N Japan/Kurile/Sakhalin/Kamchatka provenance. The taxonomic proposal here follows that view but it remains open to question as to whether the name itself has been applied correctly. Reeves *et al.* (2008) assigned the name *xanthodryas* to populations of just this same restricted range. But they lacked samples from Japan hence failed to realize that Japanese *xanthodryas* (where the name properly belongs: Ticehurst 1938, Ornithological Society of Japan 2000, and see below) represents a different molecular genetic haplotype cluster, and that it sings differently. Lobkov (1997) mentioned a transition zone between *'xanthodryas'* and nominate *borealis* in N Kamchatka. This should be investigated further with respect to genetics and vocalisations.

General characteristics: A canonical discriminant analysis based on four measurements separated *P. examinandus* (as defined from molecular genetic clades) from *P. xanthodryas* specimens without overlap, but showed slight overlap (involving only a few individuals) with *P. borealis sensu stricto* (Saitoh *et al.* 2008).

Distribution: Little known in terms of molecular genetics. Birds from N Hokkaido, Sakhalin and Kamchatka belong to the same haplotype cluster and use the same song pattern (but not documented in Sakhalin yet). At least these are united under the name *examinandus* here. Siberian mainland populations opposite Sakhalin, often referred to as *hylebata* (Vaurie 1959, Dementiev & Gladkov 1968) have not been tested yet. Here, they are assigned to *P. borealis sensu stricto* (which see) because of their song pattern.

Vocalisations (Fig. 6c–d): Territorial song follows a complicated pattern, a sequence of three syllables (note-groups), each of which is a combination of about 5 rapidly falling notes. The first two note-groups are identical, the third one differently structured, comprising 1–3 notes of pitch lower by about 1 kHz. The last note may be V-shaped, its last part distinctly longer than the first. This song type is somewhat similar to that of *P. xanthodryas*, but more irregularly

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composed. It is documented from Hokkaido in N Japan, the Kurile island of Masue, Russia (Matsuda 2002) and from S Kamchatka (Fig. 6e) and well reflects the geographic extent of the molecular genetic *P. examinandus* clade (no song record from Sakhalin available yet).

Sonagams are figured by Matsuda (2002) and Saitoh *et al.* (2006; given on the poster print only).

Phylloscopus xanthodryas (Swinhoe, 1863)

Taxon included (1): *P. xanthodryas* (Swinhoe, 1863) [Amoy (=Hsia-men = Xiamen), Fujian, China]. Monotypic.

Taxonomy: This taxon, too, was described from birds in a SE Chinese stopover or possible wintering area (Cheng, 1987, claimed wintering in Fujian and Taiwan). Breeding populations from Chukotka/E Siberia, Kamchatka, Commander Island and Japan were, and partly still are, associated with the name *xanthodryas*, but in slightly varying ways (Dickinson 2003, Hartert 1907–1909, Lobkov 1997, Mayr *et al.* 1986, Portenko 1938, Williamson 1976). Ticehurst (1938) restricted the range to all Japan plus the southern Kurile Islands. For molecular genetic reasons, however, it seems wise to apply *xanthodryas* to Japanese populations alone and even to exclude Hokkaido. The haplotype cluster of birds from Honshu, Shikoku and Kyushu is distinct, and deeply split from even its closest relative, that of E Siberia and Alaska (see *P. borealis*). For cytochrome-*b* distance values see above.

General characteristics: A canonical discriminant analysis based on measurements of wing-, wing tip-, tarsus- and head lengths separates *P. xanthodryas* (as defined by molecular genetics) without overlap from the *P. borealis sensu stricto* and *P. examinandus* clades. This is the population with the largest measurements (Saitoh *et al.* 2008).

Distribution: The Japanese main islands south to Kyushu but excluding at least N Hokkaido, where *P. examinandus* occurs (Ornithological Society of Japan 2000, Saitoh *et al.* 2008, 2010; see above: Taxonomy).

Vocalisations (Fig. 6e–f): Territorial song very stereotyped: a regular series of three syllables each consisting of 3–5 rapidly falling notes. These three syllables are followed by a short, nearly unmodulated, slightly ascending whistle, situated always in the upper frequency belt of the whole verse. This very characteristic sonagraphic pattern is only known from Japan.

Sonagams are figured by Martens (1980), Matsuda (2002) and Mauersberger (1980).

The *Phylloscopus trochiloides* complex

Species-level taxa included: *P. trochiloides* (Sundevall, 1838), and *P. plumbeitarsus* Swinhoe, 1861.

The six geographical forms of the Greenish Warbler complex inhabit a vast, nearly trans-Palaearctic area and have been, and still are, a challenge for taxonomists, systematists and evolutionary biologists. Ticehurst (1938) had already pointed out that in the area of the Sayan Mts., S central Siberia, two similar forms of the complex, western *viridanus* and eastern *plumbeitarsus* not only meet but overlap geographically and that, in this area of overlap at least, no morphological intergradation appears to occur. Except for a small gap in the arid, forestless areas of N China the *P. trochiloides* range was considered to encircle the Tibetan plateau, and Mayr (1970) had this in mind when he wrote: 'The process of geographic speciation can be followed step by step. A more dramatic demonstration of geographic speciation ... cannot be imagined'.

Fresh insights from molecular genetics and vocalisation analyses were brought in by Irwin (2000, 2002) and Irwin *et al.* (2001b, 2005), revising this notion that the Greenish Warbler constitutes a well-founded example of an avian ring species (Irwin *et al.* 2001c). Irwin (2002) and Irwin *et al.* (2001b, 2005) found two stem haplotype clusters occurring sympatrically (and possibly originating) in the western Himalayas, in a population of the present ssp. *ludlowi*. Apparently, a complete lineage sorting had occurred and one of these haplotypes was carried along a north-western expansion route, while the other moved to the east along the Himalayan chain and subsequently also northward into the SW Chinese mountains. On their historical way around the Tibetan plateau

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rim this complex of forms diverged into several sub-clusters, to form a mitochondrial tree with strong phylogeographic structure. The main molecular genetic clades finally met, and overlapped, in S central Siberia (Irwin *et al.* 2001b, 2005), thus matching Ticehurst's (1938) morphological findings. Mitochondrial and nuclear DNA analyses have confirmed that these two, now sympatric, taxa are stable and distinct, without genetic mixing (Irwin *et al.* 2005).

Striking phylogeographic structure raises the question of when the ring around the Tibetan plateau was actually formed. Though it is nearly closed now, one hardly can assume a continuous development over time, with genetic differentiation just a function of distance—the supposed characteristic of true ring species. During the ice ages at least, the northern part of such a ring could not have existed due to lack of a continuous belt of the forest (Frenzel 1968) to which Greenish Warblers are confined; indeed, high genetic distance values between members of the complex indicate breaks actually before the Pleistocene era. Ssp. *viridanus* (W Siberian), *plumbeitarsus* (E Siberian) and *ludlowi* (W Himalayan) are separated from one another by cytochrome-*b* distance values of some 6.5–6.7%, and ssp. *obscuratus* of the north-east part of the ring in Gansu and Qinghai differs from *plumbeitarsus* by 2.6% (Martens & Päckert 2007). Upper distance values here are high enough to indicate species status among the taxa concerned, also that these genetic separations had established long before the time of closure of the current ring when the climate returned to being more hospitable and dispersal within forest again became possible. Rather than step-by-step colonisation and differentiation we have to postulate populations held and differentiating in long-lasting refuge areas, and this is well reflected in the tree topology presented by Irwin *et al.* (2001b). Such forest refuge areas survived the Pleistocene even in parts of Siberia (Frenzel 1968) and, in different places, may have harboured the forerunners of present *plumbeitarsus* and *viridanus* populations. More such refuge areas may have been present in SW China (Sichuan, Yunnan, eastern Himalayas), one durable enough to have promoted the strong mitochondrial differentiation found between E and W Himalayan populations, namely the present nominate *trochiloides* and *ludlowi*—the latter being an example of a number of small-range passerine taxa endemic in the W Himalayan area (Das 1966). Accordingly, a forerunner of W Himalayan *ludlowi* colonized western Siberia and Europe to become ssp. *viridanus*, and left traces in the Caucasus and Alborz Mts. in the form of the present well-marked ssp. *nitidus* (Martens & Päckert 2007). The latter's cytochrome-*b* distance from ssp. *viridanus* and *ludlowi* is 2.5–3.1% hence within the lower range of values for the *trochiloides* complex as a whole (Helbig *et al.* 1995). These values, and vocal differences (see below), favour such an interpretation.

In sum, therefore, geographical overlap assigns species status at least to *plumbeitarsus*, sympatric with ssp. *viridanus* (Irwin *et al.* 2005, Ticehurst 1938). Combining data from mt and nuclear genes, Johansson *et al.* (2007) found molecular genetic differences distinct enough to separate three different species in this complex: *P. viridanus*, *P. plumbeitarsus* and *P. trochiloides*, the latter two forming sister taxa opposed to *P. viridanus*.

***Phylloscopus trochiloides* (Sundevall, 1838)**

Taxa included (4 relevant subspecies, a possibly extralimital one added for clarity): *P. t. viridanus* Blyth, 1843 [Calcutta, India]; *P. t. nitidus* Blyth, 1843 [Calcutta, India] EL as breeder?; *P. t. ludlowi* Whistler, 1931 [Kashmir]; *P. t. trochiloides* (Sundevall, 1838) [Calcutta, India]; *P. t. obscuratus* Stresemann, 1929 [S Tetung Mts, N Gansu, China].

Taxonomy: See general remarks above. Despite frequent support of species status for *nitidus* (del Hoyo *et al.* 2006, Mayr *et al.* 1986, Roberts 1992, Ticehurst 1938 with hesitation, Vaurie 1954, 1959, Voous 1977, Williamson 1976) it is included here in *P. trochiloides* because it is a geographic representative within this complex and genetic distance values from ssp. *viridanus* are low. Distributional documentation demonstrates general allopatry to ssp. *viridanus* (Neufeldt & v. Vietinghof-Scheel 1989) although

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Vaurie (1954) discussed their geographical overlap in Afghanistan. Ali & Ripley (1973: 171) and Ripley (1982) claimed intergradation between *viridanus* and *nitidus*, and assigned subspecies status to the latter although they did not indicate specimens examined, and Mayr *et al.* (1986) claimed intergradation between *nitidus* and W Himalayan *ludlowi*. As noted, the cytochrome-*b* distance value between *nitidus* and *viridanus* is only 2.5%, an advanced subspecies level (Helbig *et al.* 1995). This is considerably lower than between other members of the complex, where values range up to 6.5%, but similar to that between ssp. *obscuratus* and Siberian *plumbeitarsus* (2.6%), the latter being considered specifically distinct because of sympatric occurrence with ssp. *P. trochiloides viridanus* (Martens & Päckert 2007).

General characteristics: The complex is quite homogeneous in general morphology, and differentiation of subspecies is slight, except for ssp. *nitidus* whose vividly greenish upperpart and yellowish underpart coloration (Ticehurst 1938) alone has often led to an assumption of species status (see above). *P. trochiloides* as delineated here has only one wing bar, but two in ssp. *obscuratus* which is geographically and genetically closest to two-barred *P. plumbeitarsus*. Differentiation of territorial song within *P. trochiloides* is marked (see below). For behaviour of *P. trochiloides* on the Himalayan breeding ground see Diesselhorst (1968), and in the Indian winter quarters see Price (1991).

Distribution: Nearly trans-Palaearctic, from central Europe eastward across the taiga belt to central Siberia, where it overlaps with *P. plumbeitarsus*, then entirely around the rim of the Tibetan plateau except for a gap in N China caused by local deserts (not by recent human-caused deforestation as sometimes assumed). A south-western splinter (ssp. *nitidus*) is disjunct in N Turkey (Albrecht 1984, Kirwan *et al.* 2008) and the Caucasus and Alborz Mts., eastwards possibly into Tajikistan and Afghanistan, to the western approaches of Kabul. There, both *viridanus* and *nitidus* have been collected on 18 May (Vaurie 1954), but this date is no proof of breeding overlap (see Martens & Eck 1995 for late spring migration in Nepal). Roberts (1982) and Ripley (1982) mentioned alleged breeding of *nitidus* near Quetta in 1926 and 1928 but specimens seem not to have been secured and these records were never substantiated. In our area, ssp. *viridanus* reaches Xinjiang province, NW China, ssp. *obscuratus* lives in Qinghai and Gansu provinces, and ssp. *ludlowi* and ssp. *trochiloides* are Himalayan (with rare and probably temporal extensions into S Tibet near Lhasa: Lu 2009), the latter also SW Chinese. Neufeldt & v. Vietinghoff-Scheel (1989) presented a detailed map of the *nitidus* area.

Vocalisations: In territorial songs, considerable differences of syntax and frequency range between subspecies are obvious. Song belongs to the verse type; verses short and regularly structured in the Himalayas (nominate *trochiloides*, ssp. *ludlowi*), following the pattern ABABAB or ABCABCABC. German, Scandinavian and Siberian *viridanus* verses are considerably longer and more irregularly structured, although syllable repetition occurs. Ssp. *nitidus* song is especially broad-banded, up to and often exceeding 8 kHz. Males may place given syllables in individually different parts of the verse (Martens 1980). Irwin (2000) analyzed songs from all around the Tibetan plateau and found a gradual verse character change from S to the N, independently along its western and eastern rims. In both cases, this is towards longer and more irregular syntax, emphasising at least the differences between *viridanus* and *plumbeitarsus*. The latter displays a clear, homogeneous syllable structure lacking in the irregular song pattern of *viridanus* (Irwin 2000, Irwin *et al.* 2001b, Martens 1980, Martens & Päckert 2007). These differences it is assumed could act as a pre-mating reproductive isolating mechanism.

For published sonagrams see under *Phylloscopus plumbeitarsus*.

Phylloscopus plumbeitarsus Swinhoe, 1861

Taxa included (1): *P. plumbeitarsus* Swinhoe, 1861 [between Taku and Pekin (= Beijing), Hebei, China]. Monotypic.

Taxonomy: Taxon *plumbeitarsus* is a member of the *P. trochiloides* 'ring' complex. Because eastern *plumbeitarsus* and western *viridanus* meet

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and overlap in Siberia without intergradation (Irwin *et al.* 2005), however, the former is to be treated as a different biological species. The next-closest assumed *P. trochiloides* population to *plumbeitarsus*, separated from it by N Chinese deserts, is *obscuratus* in Gansu and Qinghai. But *obscuratus* itself has a disjunct range, and their cytochrome-*b* distance value is only 2.5% (Martens & Päckert 2007). Ticehurst (1938) had suggested a close relationship between them on grounds of external morphology and thought *plumbeitarsus* might still be treatable as a northward extension of *obscuratus*—speculation now supported by the low molecular distance value. Russian authors (Dementiev & Gladkov 1968, Stepanyan 1990, 2003) have not separated *plumbeitarsus* specifically.

General characteristics: External morphology in general like *viridanus*, but darker and greener on the upperparts; underparts with hardly any yellow; and whitish tips to median and greater coverts form a pair of wing bars, versus only a single, greater-covert bar in *viridanus*.

Distribution: E Siberia from the Sayan Mts. across the taiga belt to N Mongolia and extreme NE China in Heilongjiang province (Cheng 1987), reaching the Pacific coast. Area of sympatry with *P. t. viridanus*: '...in the angle formed by the Sayan Range and the Yenesei River in Russian territory both forms breed' (Ticehurst 1938: 149). Co-occurrence with ssp. *viridanus* in Mongolia, south of the known overlap area, remains unconfirmed (Mauersberger 1983).

Vocalisations: Long verses of up to 5s duration, they consist of short notes (relative to *viridanus*) combined into differing syllables that to build the verse are often repeated more than ten times. The frequency range is lower than in ssp. *viridanus* (Irwin 2000).

Sonagrams for the complex are figured in Albrecht (1984; *nitidus*), Bergmann *et al.* (2008; *viridanus*), Brooks (1992; *viridanus, nitidus*), Irwin (2000; *ludlowi, trochiloides, plumbeitarsus, obscuratus*), Martens (1980; *viridanus, trochiloides, nitidus*), Martens & Päckert (2007; *viridanus, plumbeitarsus, obscuratus, trochiloides, nitidus*), and Schubert (1982, 1983; *plumbeitarsus, viridanus*).

The *Phylloscopus* [*tenellipes*] superspecies

The formerly monotypic Pale-legged Warbler, *Phylloscopus tenellipes sensu lato*, is widely distributed around the Sea of Japan: in E Siberia on the lower Amur and Ussuri Rivers, on Sakhalin and on the Japanese main islands. Portenko (1950) described ssp. *borealoides* from Kunashir, Kurile Islands but from limited material. Vaurie (1954) was unable to support the alleged differences and synonymised it with nominate *tenellipes*. Dementiev & Gladkov (1968) upheld subspecies status for *borealoides*. However, it soon became evident that representatives of mainland Siberian and insular populations (Sakhalin, Japan) sing remarkably differently, although this information was neither discussed in any detail nor used for taxonomic purposes until Veprintsev (1987) published a disc of the voices of the *Phylloscopus* warblers of the Soviet Union. On this, songs of *tenellipes* and *borealoides* were presented as though relating to separate species. Later, the species status of *borealoides* was accepted and confirmed by Martens (1988) and Weprincew *et al.* (1989, 1990). Here, they are regarded as forming a superspecies although molecular genetic analyses indicate a close relationship. The nearest relative of the *P.* [*tenellipes*] superspecies is *P. magnirostris* and, together, these two form the sister group of *P.* [*borealis*] (Johansson *et al.* 2007). The continental and insular distribution of *P. tenellipes sensu lato* was documented by Neufeldt & v. Vietinghoff-Scheel (1987b).

Phylloscopus tenellipes Swinhoe, 1860 *sensu stricto*

Taxon included (1): *P. tenellipes* Swinhoe, 1860 [Amoy (= Xiamen), Fujian, China] probably EL as a breeder. Monotypic.

Taxonomy: See above. After ssp. *borealoides* Portenko had been revalidated and upgraded to species rank, *P. tenellipes* became monotypic.

General characteristics: Very similar to *P. borealoides* in external morphology. The latter

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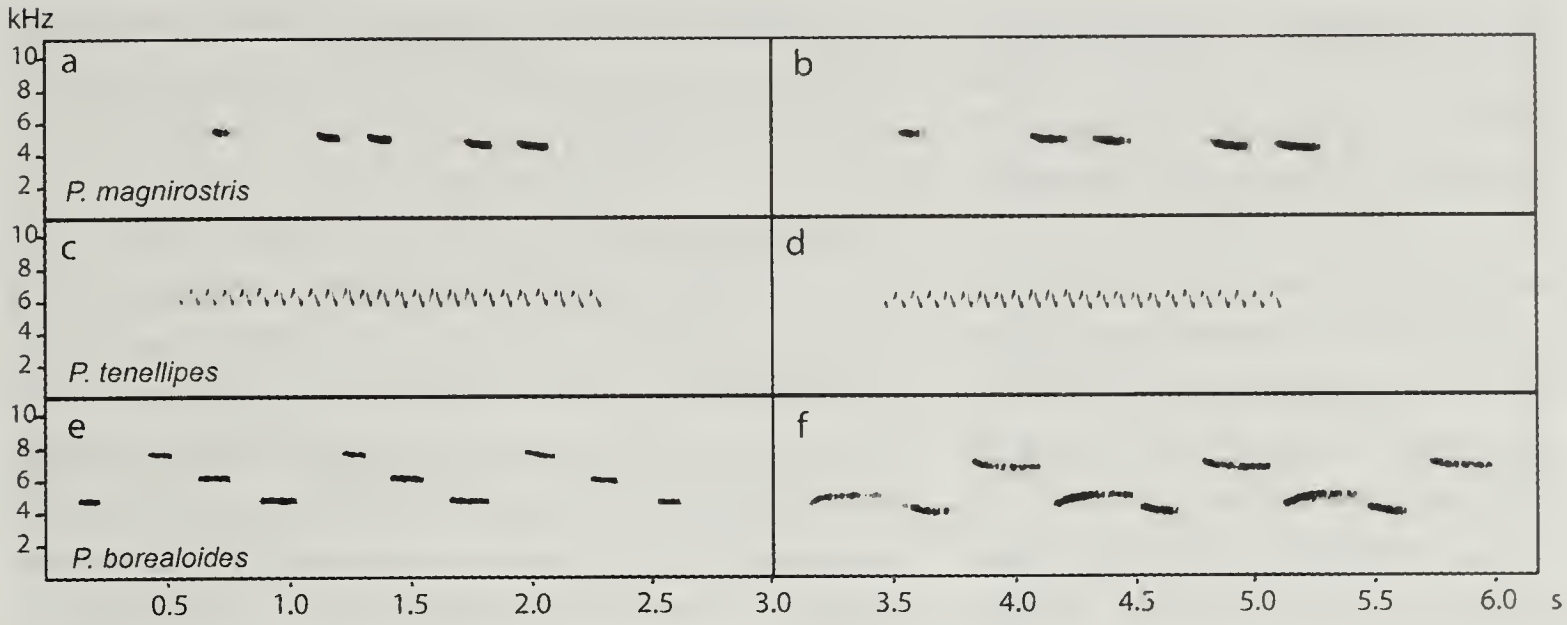

Figure 7. *Phylloscopus* territorial songs:
a, b) *P. magnirostris*: China, Gansu, Lianhua Shan;
c, d) *P. tenellipes*: Russia, Ussuri State Reservation;
e, f) *P. borealoides*: Russia, southern Sakhalin (e), Japan, National Forest of Sapporo, Hokkaido (f).
(Recordings: (a,b) J. Martens; (c–e) B. Veprintsev; (f) M. Päckert).

has greener upperparts and lacks wing bars (del Hoyo *et al.* 2006). For measurements of *P. tenellipes* and *P. borealoides* see Weprincew *et al.* (1989).

Distribution: Restricted in SE Siberia to the catchment area of the lower Amur and Ussuri Rivers, but once during the breeding season several singing males were recorded near Ulan Baatar in Mongolia, far west of the accepted distributional limit (Smirenskij & Sumjaa 1990). The breeding range is exclusively continental; no insular records are known.

Vocalisations (Fig. 7c–d): Territorial song consists of extremely uniform trills involving repetition of a double-note note-group of narrow frequency range, less than 2 kHz. Within a verse, the note-group is precisely repeated up to about 25 times. The auditory impression is insect-like. Calls are high-frequency inverted V-shaped notes. There is no acoustic similarity to *P. borealoides*, its closest relative.

Sonagrams are figured in Martens (1988) and Weprincew *et al.* (1989).

Phylloscopus borealoides Portenko, 1950

Included taxon (1): *P. borealoides* Portenko, 1950 [Kunashir, Kurile islands, Russia]. Monotypic.

Taxonomy: Closest relative is *P. tenellipes* (see above), to which it originally was assigned as a subspecies by Portenko (1950). Upgraded to species rank by Veprintsev (1987, but without explanation), by Martens (1988) and Weprintsew *et al.* (1989, 1990). Species status was accepted by Dickinson (2003), del Hoyo *et al.* (2006), and the Ornithological Society of Japan (2000), but only tentatively by Stepanyan (2003).

Distribution: Confined to the southern part of Sakhalin, the main Japanese islands of Hokkaido, Honshu and Shikoku, and the larger islands of the Kuriles, among which Kunashir is the type locality. No breeding record from the Asian mainland seems to exist.

Vocalisations (Fig. 7e–f): Territorial song is composed of two (rarely three) identical groups of clear, nearly unmodulated, high-frequency whistles. Each group consists of three whistles given at successively lower frequencies (Martens 1988, Weprincew *et al.* 1989). In frequency range and lack of modulation, song resembles that of *P. magnirostris* (which see). The quality is suited to penetrating a noisy environment and although preference for the vicinity of torrents is not definitely ascribed to *P. borealoides* a certain affinity for noisy habitat does seem to exist (E. Bezzel, pers. comm.).

Phylloscopus magnirostris Blyth, 1843

Taxon included (1): *P. magnirostris* Blyth, 1843 [Calcutta, India]. Monotypic.

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Taxonomy: No taxonomic problems are known at present. On the molecular trees available *P. magnirostris* is sister to the species-pair *P. tenellipes* and *P. borealoides* (Johansson *et al.* 2007).

General characteristics: This warbler has a special ecology. Along the Himalayan chain it lives only in close proximity to mountain torrents, for penetrating the noise of which its voice is closely adapted (see below).

Distribution: All along the Himalayan chain from Pakistan and Kashmir (Ali & Ripley 1973, Bates & Lowther 1952, Roberts 1992) into mountainous SW China where recorded in Yunnan, Sichuan, Gansu, Shaanxi and Qinghai (Cheng 1987), also in Hubei (author's unpublished observation); wherever mixed forests prevail. V. Vietinghoff-Scheel (1988d) presented a detailed map of *P. magnirostris* distribution.

Vocalisations (Fig. 7a–b): Over the whole geographical range, territorial song comprises a stereotyped cadence of five whistled notes arranged into three groups, of one, two and two notes; groups given at successively lower frequencies. Its clear, unmodulated form, in the frequency range 6.2 down to 4.3 kHz, as stated, penetrates well in noisy, running-water habitat (Martens 1980, Martens & Geduldig 1990). In China on the other hand, while displaying the same song characteristics, quite astonishingly, *P. magnirostris* occupies a much wider array of montane forest habitats, not at all limited to the neighbourhood of running water. This may be explained by the assumption that vocal and noisy habitat peculiarities were developed under strong ecological pressure from other, sympatric phylloscopines in a Himalayan refuge. Afterwards, *P. magnirostris* may have spread its range eastwards into China where a larger array of habitats open to colonisation allowed its ecological niche to expand. It is noteworthy that closely related *P. borealoides* (which see) also displays song adapted to noisy environments. The *P. magnirostris* song was correctly described by Bates & Lowther (1952), Ali & Ripley (1973), Roberts (1992), Rasmussen & Anderton (2005).

Sonagrams are figured in Martens (1980), Martens & Geduldig (1990) and Rasmussen & Anderton (2005).

Phylloscopus tytleri W.E. Brooks, 1872

Taxon included (1): *P. tytleri* W.E. Brooks, 1872 [Hirpore, Kashmir, India]. Monotypic.

Taxonomy: No special problems are adherent due to the extremely small, entirely W Himalayan range of this species. In the molecular phylogenetic topology *P. tytleri* has a clear position as sister to a monophyletic group including the *P.* [*affinis*] superspecies (represented by *P. griseolus*), *P. schwarzi* and *P. armandii* (Johansson *et al.* 2007).

General characteristics: A bird of the dry north-western parts of the Himalayas up to the timberline. 'Absence of wing bar, the conspicuous white or yellowish-white supercilium and the peculiarly long thin bill make this one of the most distinct of the Indian Phylloscopi' (Ticehurst 1938). Rasmussen (1998) gave a detailed overview of its non-breeding distribution, and techniques of identification and ageing from morphology. Due to its small range and threat from deforestation BirdLife International (2001) treated *P. tytleri* as 'near threatened'.

Distribution: One of the smallest ranges of all *Phylloscopus* species: confined to Nuristan in E Afghanistan and the NW Himalayas, locally common in high-altitude NW Pakistan and on the mountain slopes of the Kashmir valley. Alleged breeding records from further east in the Himalayas do not seem to hold (del Hoyo *et al.* 2006, Roberts 1992, Ticehurst 1938, v. Vietinghoff-Scheel 1984b).

Vocalisation: Territorial songs inconspicuous and brief, the verse only 0.4 to 0.5 s long consisting of three to five notes, most of them in a broad frequency band up to 5 kHz. Verses seem to be quite stereotyped, and broadest notes are always placed at the verse's end. With only a little variation a given song type was used by seven males in three localities on the slopes of the Kashmir valley, and other types were similarly widespread (Martens 1980). These short verses of territorial song

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had already been noted by Brooks (1872) in the original species description.

Sonagrams are figured by Martens (1980) and Rasmussen & Anderton (2005).

Phylloscopus coronatus (Temminck & Schlegel, 1847)

Taxon included (1): *P. coronatus* (Temminck & Schlegel, 1847) [Japan]. Monotypic.

Taxonomy: This is one of the taxa morphologically similar to the *P.* [*reguloides*] superspecies. It has sometimes been regarded as a constituent of a superspecies together with *P. occipitalis, P. ijimae* and *P. reguloides sensu lato* (Martens 1980, Mayr *et al.* 1986), but this grouping does not hold because *P. occipitalis* and *P. reguloides* occur sympatrically in the western Himalayas (Ali & Ripley 1973, Bates & Lowther 1952). Some previous authors believed *coronatus* to be conspecific with *P. reguloides sensu lato* and regarded it as a subspecies of the latter (Cheng 1987). Ticehurst (1938) united *coronatus* and *ijimae* subspecifically, at least pointing towards the actual relationship. Molecular genetics unites *P. coronatus* with *ijimae* as sister taxa (Johansson *et al.* 2007). *P. reguloides sensu lato* is placed in a subclade along with *P. occipitalis*, but opposed to *P. davisoni sensu lato* and *P. 'trivirgatus'*, not to *P. coronatus* (Johansson *et al.* 2007).

General characteristics: Song characteristics are similar to *P. humei* (which see), notably the extremely frequency-modulated 'tseee' call, which is part of the song of both. Differences are obvious: in *P. humei* this call starts at high frequency (descending from above 8 kHz to about 6 kHz) and is given independently from other notes. In *P. coronatus* it ascends from a low pitch of about 3.5 kHz to 6 kHz and is always attached to the end of a differently structured verse (Martens 1980). Though similar in fine structure this call type is thought to have developed independently in the two species. It is not known from any other *Phylloscopus*.

Distribution: Split into two disjunct parts. One of these is in far-E Siberia, mainly in the catchment area of the lower Amur and Ussuri rivers, plus the Japanese islands (Ornithological Society of Japan 2000), the Korean peninsula and NE China to near Beijing. The second is in SW-central China, in Sichuan (Cheng 1987, Neufeldt & v. Vietinghoff-Scheel 1987a) and S Shaanxi (author's unpublished data). In Shaanxi, it is locally common in open forest on the southern lower slopes of the Taibai Shan, Qin Ling range. The possibility of vocal and genetic differences between insular and mainland populations has not been investigated.

Vocalisations (Fig. 8a–b): Unique territorial song. Verses are short, of less than to slightly above 1s duration, and two types are used. The first one is a simple repetition of a single note (AAAA) or a two- or three-note syllable (ABAB or ABCABC), the second consists of two to four different notes and ends in a short (about 0.5s), strongly frequency-modulated 'tseee' note ('Klirrlaut' in Martens 1980). This note (and the verse types) makes the *coronatus* song as it exists in Japan, on the Siberian mainland and also in central China unmistakable. Possible fine-scale differences between these populations have not yet been investigated.

Sonagrams are figured in Higuchi & Kawaji (1989) and Martens (1980).

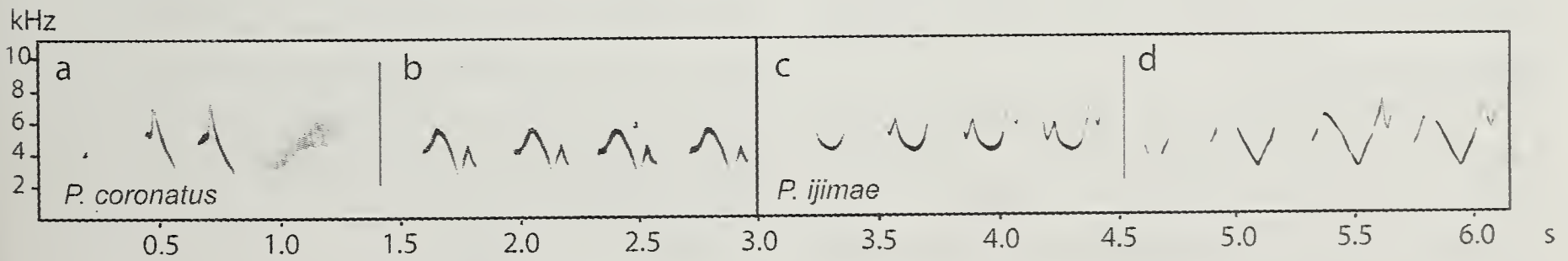

Figure 8. *Phylloscopus* territorial songs:
a, b) *P. coronatus*: Japan;
c, d) *P. ijimae*: Japan, Seven Islands of Izu.
(Recordings: (a–d) commercial disk).

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Phylloscopus ijimae (Stejneger, 1892)

Taxon included (1): *P. ijimae* (Stejneger, 1892) [Idzumura, Miyakeshima, Seven Islands of Izu, Japan]. Monotypic.

Taxonomy: Taxon *ijimae* was described as an independent species but treated by Ticehurst as a subspecies of *P. coronatus*, and by Williamson (1976) as a subspecies of *P. 'tenellipes'* (now *P. borealoides*). Vaurie (1959) and Mayr *et al.* (1986) admitted species status. Molecular genetic analysis reveals *P. coronatus* and *P. ijimae* as sister taxa, well meriting species status also on grounds of external morphology and acoustics. Mayr *et al.* (1986) incorrectly indicated 1882 as year of publication (see Morioka *et al.* 2005).

General characteristics: Unlike its closest relative, *P. coronatus*, *P. ijimae* lacks the light central coronal streak that (though sometimes weak) is always present in *coronatus*. This divergence had been noted by Ticehurst (1938) although he did not recognise its importance at species level.

Distribution: Restricted to eight of the Izu islands, east of Honshu, Japan (Ornithological Society of Japan 2000) and Nakano-shima of the Tokara group, SW of Kyushu. The latter isolate is about 1000 km away from the Izu Islands and was discovered only recently (Higuchi & Kawaji 1989). In the Izu Islands, *P. ijimae* is locally common but due to its restricted range and small, declining and severely fragmented population BirdLife International (2001) classified it as 'Vulnerable'. Yamashina (1935) and Austin & Kuroda (1953) found it quite common on several Izu islands, but it is considerably more sparse on Nakano-shima (Higuchi 1973). On a measure of area available, it is unlikely that, together, the islands ever held a population larger than a few tens of thousands of individuals (BirdLife International 2001).

Vocalisations (Fig. 8c–d): Verses of territorial song are simple repetitions of a single V- or U-shaped note (AAAA or BBBB or, less common, CCDDD). Sonagrams show the verse notes of the Nakano-shima population are all V-shaped, never more U-shaped as in Izu birds, and are all precise repetitions of only one note. The V-shaped notes are similar to those of *P. occipitalis* (which see) but the latter's verses are always of two-note types. The frequency-modulated 'tseee' note ('Klirrlaut') of *P. coronatus* (which see) is lacking in *P. ijimae* (Martens 1980), despite their close relationship.

Sonagrams are figured in Higuchi & Kawaji (1989) and in Martens (1980).

The *Phylloscopus* [*reguloides*] superspecies

Allospecies included (3): *P. reguloides* (Blyth, 1842) *sensu stricto*, *P. claudiae* (La Touche, 1922), *P. goodsoni* Hartert, 1910.

Blyth's Leaf Warbler (*P. reguloides*) has a vast distribution all along the Himalayan chain plus parts of mountainous SW China and, apparently disjunctly, in S and SE China. Recently, another disjunct area was discovered in NE China, in the Beijing area, extending the superspecies occupation zone considerably. *P. reguloides* itself is known to be polytypic, embracing seven subspecies (Dickinson 2003) but the group's taxonomic situation is not at all stable and in recent years changes have abounded. One little-known taxon from Hainan Island, *goodsoni* Hartert, declared to be similar to the tropical *P. ricketti* by Hartert (1910) and Ticehurst (1938), was assigned to the *P. reguloides* group by Olsson *et al.* (1993), and accepted as such by Dickinson (2003).

Molecular phylogenetic analysis has provided tentative evidence that *P. reguloides* is composed of deeply split clades that best warrant recognition of three allopatric but independent species (Olsson *et al.* 2005). This proposal was mentioned by del Hoyo *et al.* (2006) and in Clement's *Checklist of the Birds of the World* (Clement 2007), but was accepted by neither. That may have been due to the fact that Olsson *et al.* (2005) were unable to uncover any noticeable differentiation of vocalisations among the various geographic representatives and went so far as to claim that voices within the *reguloides* group '...are presently considered undistinguishable.'

Taxonomic splits to species level based on molecular genetic evidence alone may be seen as premature. Recently, however, it was found that genetic diversity among the allospecies of

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the *reguloides* group is convincingly paralleled by differentiation of territorial songs; and that song pattern differences alone are potentially sufficient for recognition at species level (Päckert *et al.* 2009a). Backed by this insight it has become appropriate to accept species status for the three main molecular genetic clades of the former *P. reguloides sensu lato*: *P. reguloides*

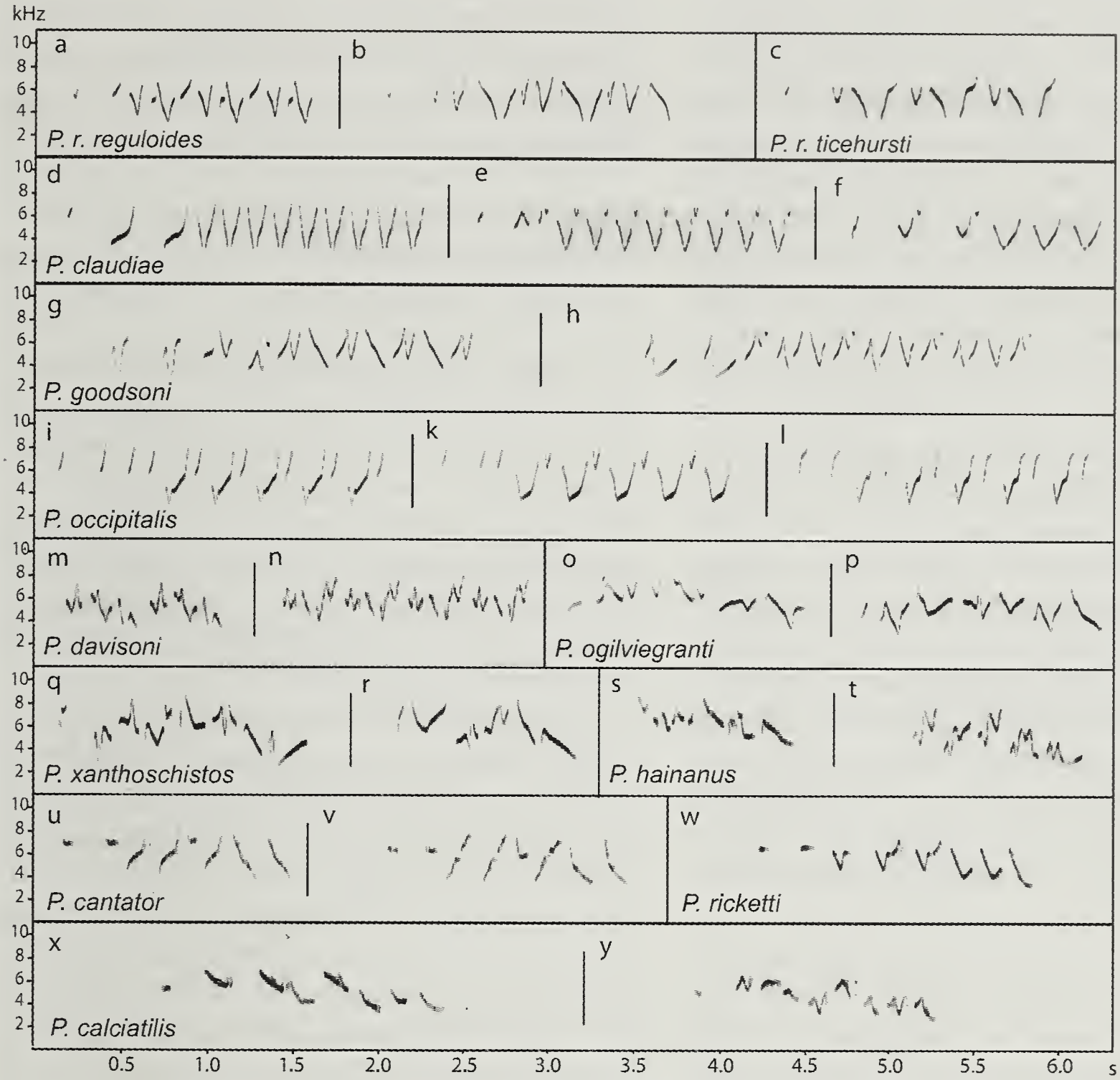

Figure 9. *Phylloscopus* territorial songs:
a, b) *P. reguloides reguloides*: Nepal, Ramechap Distr.;
c) *P. reguloides ticehursti*: China, NW Yunnan, Jizu Shan;
d–f) *P. claudiae*: China, Sichuan;
g, h) *P. goodsoni*: China, Jiangxi, Huanggang Shan;
i, k,l) *P. occipitalis*: India, Vale of Kashmir;
m, n) *P. davisoni*: China, NW Yunnan, Jizu Shan;
o, p) *P. ogilviegranti*: China, Jiangxi, Huanggang Shan;
q, r) *P. xanthoschistos xanthoschistos*: Nepal, Parbat Distr.;
s, t) *P. hainanus*: China, Hainan Island, Diao Luo Shan;
u, v) *P. cantator*: Nepal, Bhojpur Distr.;
w) *P. ricketti*: China, Sichuan;
x, y) *P. calciatilis*: Laos, Hin Namno National Protected Area.
(Recordings: (a–w) J. Martens; (x–y) P. Davison, based on electronic supplement and supporting information in Alström *et al.* 2009).

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(Blyth) *sensu stricto*, *P. claudiae* (La Touche) and *P. goodsoni* Hartert, although contact zones between taxon pairs have not yet been identified. *P. occipitalis* (which see) is closely related to this group.

In all allospecies of the *P.* [*reguloides*] superspecies, territorial song has a regular structure of repeated units, be they syllables (note-groups) or single elements (notes). One song pattern common to all species of this group is composed exclusively of repeated syllables of 2–4 alternating elements (pattern ABABAB or ABCABCABC; every letter representing one note). However, species- and even population-level repertoires also include song types of different patterns (see below). In general terms of speed of note repetition relative to note variation in territorial song, structure ranges from 'rapid and simple' to 'slow and complex' in the order *P. occipitalis* (which is not a component of the superspecies but a close ally), *P. claudiae*, *P. reguloides sensu stricto* (its subspecies follow in the order ssp. *reguloides*, ssp. *assamensis* and ssp. *ticehursti*), ultimately to *P. goodsoni* (Martens *et al.* 2011). Though acoustic differences between clade representatives are obvious, it is still unknown if these, or perhaps other undetected characters, would act as pre-mating isolating mechanisms (barriers to hybridisation) upon contact in the wild.

Phylloscopus reguloides (Blyth, 1842) *sensu stricto*

Taxa included (4): *P. r. kashmirensis* Ticehurst, 1933 [Simla, NW Himalayas, India]; *P. r. reguloides* (Blyth, 1842) [Calcutta, India]; *P. r. assamensis* Hartert, 1921 [peak near Shillong, Khasia Hills, India]; *P. r. ticehursti* Delacour & Greenway, 1939 [Langbian Plateau, S Vietnam].

Taxonomy: Molecular genetic and acoustic analysis (Olsson *et al.* 2005, Päckert *et al.* 2009a) link these subspecies as a closely related, monophyletic cluster unitable under a common species name. They form a well-circumscribed clade in the molecular topology, and territorial song is similar over their quite large collective area of occupation (see below). However, acceptance of these subspecies is not so straightforward just on morphology. Ticehurst (1938) acceded to *assamensis* reluctantly and Vaurie (1954) pleaded that it not be accepted because he found it to be 'a very poorly defined form which cannot be separated with certainty from nominate *reguloides*'. Depending on the origin of samples, placement of *assamensis* in the molecular tree is either with the more northern (Myanmar) or southern (NW Thailand) populations of the *reguloides* clade (in the sense accepted here) (Olsson *et al.* 2005). At the same time, Päckert *et al.* (2009a) found *reguloides* from Nepal and *assamensis* from Chin State, Myanmar separated by a cytochrome-*b* distance value of 2.3%, while nominate *reguloides* (incl. ssp. *assamensis*) and ssp. *ticehursti* showed a distance value for this gene of 3.1–3.6% (up to 3.8% according to Päckert *et al.* 2009a)—quite large for a within-species difference. Again, W Himalayan *kashmirensis* is genetically close to nominate *reguloides* but well separated from it on external morphology, especially coloration (Ticehurst 1933, Vaurie 1954). Species-limits as proposed by Olsson *et al.* (2005) and favoured by Päckert *et al.* (2009a) are perhaps not the final word.

General characteristics (Plate 2a–d): Vaurie (1959) indicated morphological differences between nominate *reguloides* (incl. *assamensis*) and *claudiae* (which see) but did not discuss differences from SE Asian *ticehursti* which he treated as extralimital in respect of the Palaearctic fauna. But *ticehursti* also occurs in NW Yunnan (Päckert *et al.* 2009a), well into the Palaearctic realm, and its distribution is somewhat squeezed between those of nominate *reguloides* and *P. claudiae*. Morphological differences exist, e.g., in general coloration, *ticehursti* (Plate 2c–d) being darker, less light green on the upperparts than nominate *reguloides* (Plate 2a–b), with lateral coronal stripe markedly more pronounced; but details are to be worked out anew.

Distribution: A Sino-Himalayan endemic occupying the Himalayan chain from Kashmir in the west, W Myanmar, NW Thailand, NW and S Vietnam, and in China known from NW Yunnan; range boundaries as yet unmapped in detail (see preliminary map proposal for the allospecies of *P.* [*reguloides*] in Päckert *et al.* 2009a and Martens *et al.* 2011). The

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whereabouts of presumed zones of secondary contact between nominate *reguloides* and *ticehursti* (considered conspecific here, but see cytochrome-*b* characters) and *reguloides* and *P. claudiae* are still unknown.

Vocalisations (Fig. 9a–c): Territorial song consists of repeated syllables of from two to four notes (ABABAB, ABCABC), a song pattern found in all *P. reguloides* subspecies (Martens 1980, Päckert *et al.* 2009a). The verse is preceded by at least one introductory note.

Sonagrams are figured in Martens (1980), Martens *et al.* (2011; three subspecies), Päckert *et al.* (2009a) and Rasmussen & Anderton (2005).

Phylloscopus claudiae (La Touche, 1922)

Taxon included (1): *P. claudiae* (La Touche, 1922) [Mengtz, S Yunnan, China]. Monotypic.

Taxonomy: *P. claudiae* is a constituent of superspecies *P.* [*reguloides*] (see above), given monotypic species status largely on molecular genetic evidence (Olsson *et al.* 2005). Its genetic distance value from *P. reguloides* (all subspecies tested) is at least 6.2 % (Olsson *et al.* 2005) and up to to a remarkable 7.0–7.9 % according to Päckert *et al.* (2009a), but on morphological grounds Ticehurst (1938: 173) claimed 'complete intergradation with *assamensis*' (i.e., *P. reguloides sensu stricto*). The molecular distance value of *claudiae* from S Chinese *P. 'goodsoni'* is 7.3 % (Päckert *et al.* 2009a).

General characteristics (Plate 3a–b): The species status of *claudiae* relies on molecular genetic and vocal plus just a few morphological differences. Possible contact zones between *P. claudiae* and *P. reguloides ticehursti* are undiscovered but may be expected in S Sichuan, *ticehursti* being known from NW Yunnan (skins from Yizu Shan at MTD Dresden).

Distribution: Chinese endemic. The type locality of *claudiae* is Mengtz in S Yunnan (La Touche 1922a) and the description is likely to have been based on migrants, collected in mid-October. This region is not known to be a part of the breeding range of any allospecies of the *P.* [*reguloides*] superspecies (map in Martens *et al.* 2011). Ticehurst (1938) gave the breeding range of *claudiae* as N, NW, W and W-central Sichuan. This has been confirmed from molecular data (Päckert *et al.* 2009a), and his assumption of occurrence in Shaanxi (records from Qin Ling Range; skins at MTD Dresden) and Hubei provinces (Ticehurst *loc. cit.*) has also been confirmed (see Cheng 1987). Unexpected are newly discovered occurrences in Hebei province, far to the northeast of remotest known localities in S Shaanxi, and molecular genetics and territorial song confirm the correct assignment of this Hebei population (Olsson *et al.* 2005, Päckert *et al.* 2009a). Records from Yunnan and those from S Sichuan listed as *claudiae* by Ticehurst (1938) may fall in the area of *ticehursti* as his 1938 revision was published prior to the description of *ticehursti* (see preliminary map proposal in Päckert *et al.* 2009a and Martens *et al.* 2011).

Vocalisations (Fig. 9d–f): Territorial song consists of medium to rapid (dense) trills of a single repeated element (AAAAAA), a syntax pattern found only in the repertoire of *P. claudiae*, where it is always combined with one or two introductory notes. However, trill songs of this kind were absent from the repertoires of all *P. claudiae* males recorded in S Shaanxi (n=21, at four different localities on or south of the Taibai Shan massif), and replaced there by verses of repeated syllables (note-groups, Fig. 9 e–f) (Päckert *et al.* 2009a).

Sonagrams are figured in Martens *et al.* (2011) and Päckert *et al.* (2009a).

Phylloscopus goodsoni Hartert, 1910

Taxa included (2): *P. g. goodsoni* Hartert, 1910 [Lei Muimon, Hainan I., China]; *P. g. fokiensis* Hartert, 1917 [Kuatun (= Guadun), NW Fukien (= Fujian), China].

Taxonomy: Hartert (1910) described an independent species, *P. goodsoni*, based on two specimens (AMNH 450.282 and a presumed paratype, 450.283) from the southern part of Hainan Island. Ticehurst (1938) revised the type, the only specimen available to him, and found it extraordinarily similar to *P. ricketti* (which see), a species with conspicuously 'uniform lemon yellow under parts and marked lateral coronal streaks, nearly black in colour, [...] the central coronal streak is yellower than in any except *goodsoni* and there is a double

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wing bar.' So similar did he find these taxa that he united them under a single species name *ricketti*, but maintained *goodsoni* as the insular representative: *P. ricketti goodsoni*. Ticehurst characterised *goodsoni* as 'Like *ricketti* but paler and smaller .... Appears to be a small, bright, pale race of *ricketti*', and gave measurements: wing, male 53.5 mm; tail, male 39.5 mm. Cheng (1987) differed and instead united *goodsoni* with *P. cantator* (Tickell), another small, bright yellow *Phylloscopus* warbler but in this case with a whitish belly. Molecular genetics (mt and nuclear) supports neither of these views. On the molecular phylogenetic tree, only *P. ricketti* and *P. cantator* are sisters (but see *P. calciatilis*, below) and neither of these is closely related to *P. goodsoni*. Instead, the *P. ricketti*/*P. cantator* pair is sister to a clade comprising all allospecies of the *P.* [*reguloides*] and *P.* [*davisoni*] superspecies, also of *P. occipitalis* (Johansson *et al.* 2007, Päckert *et al.* 2009a).

An early assumption that *P. goodsoni* Hartert bred on Hainan was unwarranted as the two specimens on which the original description was based, indeed the only ones so far listed from the island, were collected at mid winter, in December and January. It nevertheless caused certain taxonomic and distributional rearrangements to be made to the *P.* [*reguloides*] and *P.* [*davisoni*] superspecies (Alström *et al.* 1995, Olsson *et al.* 2005, Päckert *et al.* 2009a). Alström *et al.* (1995) re-evaluated the taxonomic status of *goodsoni* and on morphological grounds found it to be close to '*P. reguloides*', especially to the mainland SE Chinese taxon *fokiensis*, then being treated as a subspecies of *P. reguloides sensu lato*. Though its breeding range remained undefined, Alström *et al.* finally attached *goodsoni* to '*P. reguloides*' as a separate subspecies, citing especially the form of the two outer rectrices. In *goodsoni*, the outermost (R6) bears only a narrow (1mm or less wide) white margin, similar to that of *fokiensis*, and the size and general coloration of these two taxa are also alike. In the meantime, Olsson *et al.* (1993) had described *P. hainanus* (which see), an apparently genuine Hainan Island endemic differing markedly in coloration, size and vocalizations from all accepted mainland representatives of *P. reguloides sensu lato*, *goodsoni* and *fokiensis* included.

Within the limits of the *P.* [*reguloides*] superspecies adopted here, and on the combined evidence of external morphology, song and molecular genetics, *P. goodsoni* is treated as an allospecies with two subspecies: nominate *goodsoni* and ssp. *fokiensis*, the latter said to be more whitish, less yellowish on the underparts than nominate *goodsoni*. *P. goodsoni* differs from *P. reguloides* (ssp. *assamensis*, *ticehursti* and nominate *reguloides*) by 6.7–7.6% cytochrome-*b* distance values, and from *P. claudiae* by 6.1% (Päckert *et al.* 2009a). Nominate *goodsoni* and ssp. *fokiensis* show a molecular genetic distance value of only 0.2 to 0.5 % (Olsson *et al.* 2005), which is not more than a population-level difference.

General characteristics (Plate 3c–f): An apparent S Chinese allospecies of the *P.* [*reguloides*] superspecies. Relative to others of this group the *P. goodsoni* back is conspicuously light greenish, slightly tinged with yellow. Underparts are also tinged with yellow, but considerably less in *fokiensis* than in nominate *goodsoni*. On current knowledge, a zone of secondary contact between *P. g. goodsoni* and *P. reguloides ticehursti* is to be expected in westernmost Guangdong province or in NE Vietnam. The record-void gap between the extreme localities of these forms is still large.

Distribution: A Chinese endemic described from two mid-winter specimens from Hainan Island (Hartert 1910). None was found there during several days of observation in spring (author's data, Olsson *et al.* 1993) and in the absence of further records the types of *goodsoni* are assumed to have been winterers outside the breeding range of the species. Olsson *et al.* (1993) recorded a March-dated specimen from the opposite mainland and (2005) indicated three additional localities in Guangxi, Guangdong and Hongkong, but without giving precise observation data or saying whether specimens were collected. Knowledge of the breeding area of *P. goodsoni* has thus remained scanty, but with records from Guangdong, Guangxi, Jiangxi and Fujian provinces plus, according to Cheng (1987), W Hubei and Guizhou—all in

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southern China. Quite unexpectedly, however, two *reguloides* group specimens (skins in MTD Dresden; Plate 3c–d) dated 10 May from near Foping, 1300 m, southern slopes of the Qin Ling Range in S Shaanxi, carried cytochrome-*b* haplotypes of the *goodsoni* cluster. These two males were singing and had developed testes. During the two days of field work there no other individuals of the *reguloides* group were observed. But *claudiae* is common only slightly further north, in the Taibai Shan area, making this the first record of presumed sympatry [if not actual syntopy] between two members of the [*reguloides*] superspecies (Päckert *et al.* 2009a). It is noteworthy that these two specimens are in general coloration close to the local S Shaanxi *P. claudiae* (see Plate 3).

Vocalisations (Fig. 9g–h): Territorial song consists of a distinct trill/syllable combination with 2–3 highly modulated elements at the beginning, followed by a long repetition of syllables (AA BCDBCDBCD...). The short, narrow-banded introductory note of the songs of other allospecies of *P.* [*reguloides*] is missing.

Sonagrams of ssp. *fokiensis* song are figured in Martens *et al.* (2011) and Päckert *et al.* (2009a).

Phylloscopus occipitalis (Blyth, 1845)

Taxon included (1): *P. occipitalis* (Blyth, 1845) [Nellore, S India] (syn. *P. o. kail* Koelz, 1938). Monotypic.

Taxonomy: Formerly, *occipitalis* was attached to *P. coronatus* from E Siberia and central China (Hartert 1907–1909), and was still being maintained as a subspecies by Cheng (1987). This has proved to be incorrect. Although quite similar in their external morphology, these taxa represent distinct species and are not closely related, with quite different positions on the molecular phylogenetic tree. Their voices are also not at all alike. *P. occipitalis* is sister to a clade comprising all allospecies of the *P.* [*reguloides*] and *P.* [*davisoni*] superspecies, while *P. coronatus* has turned out to be sister to small-island *P. ijimae* of Japan (Johanssen *et al.* 2007, Päckert *et al.* 2009a). Nor does a superspecies affiliation (Martens 1980) hold because *P. occipitalis* and *P. reguloides sensu stricto* occur sympatrically in the W Himalayas (Ali & Ripley 1973, Bates & Lowther 1952); also molecular genetics contradicts. *P. o. kail* Koelz, 1938 from E Afghanistan was not accepted by Vaurie (1954) or by Mayr *et al.* (1986).

Distribution: A W Himalayan endemic ranging from E Afghanistan (v. Vietinghoff-Scheel 1988) into westernmost Nepal (Grimm & Fischer 2003, specimens at NME Erfurt).

Vocalisations (Fig. 9i–l): The highly stereotyped song pattern is a variation of the pattern occurring widely among allospecies of *P.* [*reguloides*], supporting the close relationship of *occipitalis* and the *P.* [*reguloides*] superspecies. Verses are composed exclusively of two-note syllables (note-groups); the introductory note is several times repeated and, in addition, forms the shorter second note of the syllables (aaa BaBaBaBa) (Martens 1980, Päckert *et al.* 2009a). Every male exhibits up to five (Kashmir) or seven (Afghanistan) different song types, and males are recognizable individually by their syllable repertoire. However, Afghan and Kashmir repertoires are very similar and individual verses can be identical (Martens 1980).

Sonagrams are figured in Löhrl & Thielcke (1969), Martens (1980), Martens *et al.* (2011), Päckert *et al.* (2009a) and Rasmussen & Anderton (2005).

The *Phylloscopus* [*davisoni*] superspecies

Allospecies included (4): *P. davisoni* (Oates, 1889) *sensu stricto*, *P. ogilviegranti* (La Touche, 1922); *P. xanthoschistos* (J. E. Gray & G. R. Gray, 1846), *P. hainanus* Olsson, Alström & Colston, 1993.

This is a complex group of small, vividly greenish and partly bright yellowish warblers that in a number of traits surprisingly parallels the *P.* [*reguloides*] superspecies. Both are Sino-Himalayan with a strong distributional bias towards tropical Southeast Asia, southwards to S Vietnam, and in many places representatives have been found side by side in the same habitat (author's personal observations in Sichuan, Shaanxi, Fujian, Jiangxi, and Nepal). Coloration and patterns of coronal stripes and wing bars are extremely similar, although their taxa differ considerably in both size and vocalisations,

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and strong molecular genetic differentiation has occurred. A map showing the allospecies' tentative distribution is presented by Martens *et al*. (2011).

In terms of molecular genetic distance values, splits are deeper in the *reguloides* than in the *davisoni* group but have still led to near-identical distributional patterns of haplotype clusters. In each superspecies there is a Himalayan area (including NW Myanmar), an extended area from SW China south to Southeast Asia (which appears bipartite in the *reguloides* group), and finally a SE Chinese area. However, southern populations of *davisoni*, south from SW China, are still little known morphologically, vocally or genetically, and even within China many gaps in knowledge of distribution, ecology and vocalisations remain to be filled.

In addition, the taxonomy of the *davisoni* complex has changed in recent years, with an inter-generic import from *Seicercus* in the form of *Phylloscopus* (formerly *Seicercus*) *xanthoschistos*, the description of a new species, *P. hainanus*, and the upgrading of several subspecies to independent species status. The resulting situation is far from straightforward, requires to be discussed in some detail, and is open to substantial further research. I follow the subdivisions of the *P.* [*davisoni*] clade proposed by Olsson *et al*. (2005) and Päckert *et al*. (2009a). The taxa they include, and species-limits recognised, are the current best estimate of relationships overall, although molecular results are not unequivocal. Where they occur, some mitochondrial gene differences are spectacular. (For a provisional distribution map of the superspecies' allospecies, see Martens *et al*. 2011).

Reliance exclusively on mitochondrial gene distance values plus the topology of the molecular genetic tree supports the following of Olsson *et al*. and Päckert *et al*.'s conclusions: the former *Seicercus* (now *Phylloscopus*) *xanthoschistos* and *P. davisoni sensu stricto* are sisters, as is a set of populations ranking partly as subspecies of *P. ogilviegranti* (see below) and the newly described *P. hainanus*. These taxa are allopatrically distributed. However, genetic distance values amount to 4.0–4.7% between *xanthoschistos* and *davisoni sensu stricto* and its subspecies (Olsson *et al*. 2005), or 4.4% (Päckert *et al*. 2009a), and just 2.0 % (Päckert *et al*. 2009a; only 1.8% according to Olsson *et al*. 2005) between the *ogilviegranti* set and *hainanus*. In many cases, a 4% value is considered enough to indicate species but the other, shallower splits are at probable subspecies level only (cf. Helbig *et al*. 1995). At the same time, as stated, there are surprising colour convergences across taxon pairs. Thus *P. xanthoschistos* is a yellowish-greenish warbler, and so is *P. hainanus*—a strong hint that coloration is no reliable indicator of phylogenetic relationship in *Phylloscopus* warblers (see also the *P. fuscatus*/*P. fuligiventer* group, and this is evident in other passerine groups to which molecular techniques have been applied, e.g., *Parus* tits, see Eck & Martens 2006: 23–28, Päckert & Martens 2008).

Members of the *P.* [*davisoni*] superspecies have more complex and less regular songs than those of the [*reguloides*] superspecies. Element duration averages slightly longer and element variation within a given individual song is notably higher in the [*davisoni*] clade. In most constituent species songs tend to decrease in frequency towards the end of the verse, often terminating in a highly modulated V-shaped element, most obvious in *P. hainanus* and *P. xanthoschistos*. Repetitive elements, or syllables, are entirely missing in songs of these two species, and only the repertoires of *P. ogilviegranti disturbans* and *P. davisoni sensu stricto* include regularly structured songs of syntax type ABCABCABC. Trilled songs are generally absent. Territorial songs are similar in all representatives of this group: note-rich verses of various but not very different syntax patterns, and assorted, quite different notes that give no indication of which vocal traits might be important for species-specific recognition by the birds themselves.

The following species definitions are as proposed for the *P.* [*davisoni*] group by Olsson *et al*. (2005) and Päckert *et al*. (2009a).

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Phylloscopus davisoni (Oates, 1889) *sensu stricto*

Taxon included (1): *P. davisoni* (Oates, 1889) [Muleyit Mt., N Tenasserim, Burma (= Myanmar)]. Monotypic.

Taxonomy: On molecular genetic grounds Olsson *et al.* (2005) split the White-tailed Warbler (*P. davisoni sensu lato*) into two species, *P. davisoni sensu stricto* and *P. ogilviegranti* La Touche, and with access to considerably more material Päckert *et al.* (2009a) corroborated their results. However, it is unproven whether Oates's type material of the taxon *davisoni* actually belongs to the species as now defined by molecular genetics.

General characteristics (Plate 4b–d): As stated, it had become evident that '*Seicercus*' *xanthoschistos* is nested firmly in the *Phylloscopus* molecular tree as the sister to *P. davisoni sensu stricto*. Their molecular genetic distance value is only 3.6% (Päckert *et al.* 2009a) although vocal and coloration differences are substantial. There may be sympatric occurrences of these genetic sisters in N Myanmar but no objective proof is available. Ticehurst (1938: 177) described possible intergrades between *davisoni* and *disturbans* (for which taxon see below) from 'S.W. Chwanben' (present W Sichuan).

Distribution: Little known but possibly widely ranging, from N Yunnan and the sub-Himalayan region of eastern Myanmar to N Tenasserim and N Thailand. Apart from the Tenasserim type, there are vocal and molecular genetic-proven records of *P. davisoni sensu stricto* from NW Thailand (Chiang Mai area: Olsson *et al.* 1995, Päckert *et al.* 2009a) and from NW Yunnan (Jizu Shan: Päckert *et al.* 2009a). Sichuan, Shaanxi, south-eastern Chinese and southern Indochina records belong to *P. ogilviegranti* (which see). See also specimen-based records in Ticehurst (1938: 176 and map therein, and in Martens *et al.* 2011).

Vocalisations (Fig. 9m–n): Territorial song mostly consists of irregular, short verses up to 1.5s long, but regular syntax structures also occur, in the pattern ABCABCABC.

Sonagrams are figured in Päckert *et al.* (2009a).

Phylloscopus ogilviegranti La Touche, 1922

Taxa included (4): *P. o. ogilviegranti* La Touche, 1922 [Bohea Mts., Kuatun (= Guadun), Fokien (= Fujian province), China]; *P. o. disturbans* La Touche, 1922 [Mengtz, S. Yunnan, China]; *P. o. klossi* (Riley, 1922) [Langbian Peak, S Annam; present S Vietnam]; *P. o. intensior* Deignan, 1956 [Khao Kuap, 12°25'N 102°50'E, Trat province, SE Thailand].

Taxonomy: *P. ogilviegranti* results from a split of *P. davisoni sensu lato* (see above) and on acoustic and molecular genetic analytical grounds now comprises nominate *ogilviegranti*, ssp. *disturbans*, ssp. *klossi* and ssp. *intensior*. The last, however, has not yet been genetically proven and its assignment to *P. ogilviegranti* versus *P. davisoni* is equivocal. In the course of recent studies it has turned out that *P. hainanus*, a recent novelty from Hainan Island (see below), is not only closely related but is actually firmly nested in the molecular clade of the *P.* [*davisoni*] superspecies; also that either the taxon group nominate *ogilviegranti*, ssp. *disturbans* and ssp. *klossi* and *hainanus* (Olsson *et al.* 2005) or only *klossi* and *hainanus* (Päckert *et al.* 2009a) within the *b* haplotype network are sisters (only one *klossi* sample involved in both results).

General characteristics (Plate 5a–d): *P. ogilviegranti* differs from *P. davisoni sensu stricto* in tending to be more vividly greenish, SE Chinese populations also showing enhanced yellowish on the underparts. Within-species genetic variation is low, distance amounting to only 0.4% between nominate *ogilviegranti* and ssp. *disturbans*, an obvious population- or subspecies-level value (Päckert *et al.* 2009a).

Distribution: Has a large distribution in E and Southeast Asia, representing the *P.* [*davisoni*] superspecies in central China (Sichuan, Shaanxi and Gansu; ssp. *disturbans*), possibly disjunctly in Jiangxi, Fujian and Guizhou (nominate *ogilviegranti*), also in far-SE Thailand and neighbouring Cambodia (ssp. *intensior*) (Eames *et al.* 2002) and on the Langbian plateau in S Vietnam (ssp. *klossi*). There is virtually no information on possible contact zones between *P. ogilviegranti* and *P. davisoni*.

Vocalisations (Fig. 9o–p): Territorial song consists of short, irregular warbles (see glossary

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of terms) up to 1.5 s long with mean frequency tending slightly up or down at the end of the verse. Notes are generally longer and less modulated than those of *P. davisoni sensu stricto.* A regular verse pattern in the order ABABAB also occurs, but rarely.

Sonagrams of *P. o. disturbans* and *P. o. ogilviegranti* are figured in Päckert *et al.* (2009a).

Phylloscopus hainanus Olsson, Alström & Colston, 1993

Taxon included (1): *P. hainanus* Olsson, Alström & Colston, 1993 [Diao Lu, Lingshui County, southern Hainan Island, China]. Monotypic.

Taxonomy: In urgent need of further revision. *P. hainanus* was described as an independent species mainly on the basis of its unusual coloration which differs considerably from *P. goodsoni*, then the only other *Phylloscopus* taxon known from Hainan Island. On the S Chinese mainland opposite Hainan another bright yellow *Phylloscopus* species, *P. ricketti*, occurs, but molecular genetics revealed them not to be closely related (Olsson *et al.* 2005, Päckert *et al.* 2009a). However, *P. hainanus* is closely related to the E and S Chinese *P. ogilviegranti* (see above), with a molecular genetic distance value of only 2% (or even less). Such a low divergence would not normally signify species status, but Olsson *et al.* (2005) proposed to retain *hainanus* as a separate species because of its disjunct island distribution; also because of its distinct coloration, clearly different from known close relatives.

Alone, neither argument holds under any recognised species concept and, as noted (see *P. fuligiventer*), there is at least one other instance in *Phylloscopus* where divergent coloration obscures an actual relationship. Päckert *et al.* (2009a) claimed *P. hainanus* and *P. ogilviegranti klossi* from southern Vietnam 'to be equally differentiated from continental Chinese populations and [they] might have originated from a common Southeast Asian ancestor.' This again does not back independent species status for *P. hainanus.*

General characteristics (Plate 4e–f): A medium-sized leaf warbler of striking appearance due to its bright yellow underparts, yellowish green upperparts and the two outer rectrices nearly completely white (Plate 4), features peculiar within the *P.* [*davisoni*] superspecies.

Distribution: Chinese endemic. Restricted to Hainan Island where widely distributed in forested mountains although the area available to it is today quite restricted (Liang Wei pers. comm.). It prefers forest edge situations and takes advantage of broad forest roads and clearings within the island's now much reduced tropical forest. Not a lowland species.

Vocalisations (Fig. 9s–t): Verses of the territorial song are short, about 1s long. Syntax is largely irregular, but single verses may follow the pattern 'several introductory notes + ABCABC' (see Olsson *et al.* 1993: Fig. 1a). Calls are of the 'verse type', i.e., a combination of several different notes forming a short verse—a call type widespread in the *P.* [*davisoni*] superspecies.

Sonagrams are figured in Olsson *et al.* (1993) and Päckert *et al.* (2009a).

Phylloscopus xanthoschistos (J. E. Gray & G. R. Gray, 1846)

Taxa included (4): *P. x. xanthoschistos* (J. E. Gray & G. R. Gray, 1846) ['Nepal', the central valley, i.e., Kathmandu valley, *fide* Fleming & Traylor 1964]; *P. x. jerdoni* (W. E. Brooks, 1871) [Sikkim]; *P. x. flavogularis* (Godwin-Austen, 1877) [near Saddya = Sadiya, Assam, India]; *P. x. tephrodiras* (Sick, 1939) [Mt. Victoria, Chin Hills, Burma (=Myanmar)].

Taxonomy: *'Seicercus' xanthoschistos* is firmly nested in the *Phylloscopus* molecular tree as a close relative of *Phylloscopus davisoni sensu lato,* especially of its component *P. davisoni sensu stricto* (Johansson *et al.* 2007, Olsson *et al.* 2005). In a topology comprising cytochrome-*b* and 16S rRNA genes, however, *P. xanthoschistos* emerges as sister to a clade including *P. davisoni sensu stricto, P. ogilviegranti* and *P. hainanus* (Päckert *et al.* 2009a). On grounds of genetically and vocally proven close relationship to the largely allopatrically distributed *P. davisoni sensu lato, P. xanthoschistos* is treated here as an allospecies of the *P.* [*davisoni*] superspecies (see above).

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General characteristics (Plate 4a): A warbler with an overall yellowish coloration, lighter on the underparts, dull greenish yellow on the upperparts, giving a *Seicercus*-like impression. Molecular genetics proved this judgement to be wrong (Olsson *et al.* 2004, Päckert *et al.* 2004).

Distribution: Himalayan, with extensions to N, W and SW Myanmar. Dickinson (2003) indicated N Myanmar to be within the geographical range of the closely related *P. davisoni sensu stricto* but nowhere in that area have they been proven to occur sympatrically.

Vocalisations (Fig. 9q–r): Territorial song is a short warble 0.5–1.4s long, with irregular syntax of 5–9 notes all of which are different. The individual male uses at least five verse types, differing in length and composition, and all the notes of successive verses may differ. Repetition of notes within a verse is rare. Frequency within a verse spans up to 5 kHz, and individual notes up to 4.5 kHz. Warning calls at the nest are verse-like, composed of 4–5 notes, and these 'verses' differed between the male and female of a pair at the nest (Martens & Eck 1995: Fig. 84t–u, t'–u').

Sonagrams are figured in Martens & Eck (1995), Päckert *et al.* (2004, 2009a) and Rasmussen & Anderton (2005).

Phylloscopus emeiensis Alström & Olsson, 1995

Taxon included (1): *P. emeiensis* Alström & Olsson, 1995 [Emei Shan (=Omei Shan), Sichuan province, China]. Monotypic.

Taxonomy: In terms of outward appearance very similar to various representatives of the *P. reguloides* and *P. davisoni* complexes, but this impression is superficial. *P. emeiensis* lacks wing-flicking behaviour, which is characteristic in these two complexes, and the syntax of its territorial song differs markedly (Alström & Olsson 1995). In a molecular genetic topology of three genes (mt and nuclear) *emeiensis* emerged basal to the *P. trochiloides/P. plumbeitarsus* complex, although with low statistical support (Johansson *et al.* 2007).

General characteristics: Despite its characteristic song, this enigmatic species long escaped notice. Throughout its range it seems either to be rare or to occur irregularly, being common in a place for a couple of years but absent or rare in later years. This holds especially true on the Omei Shan, from where the species was described. A good field mark, at least under favourable circumstances, is the prominent outer wing bar.

Distribution: A Chinese endemic the distribution of which is still not clearly understood. Recorded sparsely in S Shaanxi (north to the Foping area), SE Sichuan and NE Yunnan, E Guizhou (Fanjing Shan) and, in the south, NE Guangdong (Nanling nature reserve: Sun Yue-Hua, pers. comm.), over a total latitude span of roughly 1100 km. Additional to the Omei Shan type locality, Stattersfield *et al.* (1998) cite Fanling Shan nature reserve and further remark ' . . . was found to be common in the Daliang Shan and adjacent northern Yunnan', although Daliang Shan (SE Sichuan) was not explicitly listed in their accompanying table. MacKinnon & Phillipps (2000) added no further records; Robson (2000) gave 'SC Sichuan'; Zheng (2005) summarized range as 'C Yunnan, Sichuan'; and del Hoyo *et al.* (2006) repeated statements for the southwestern provinces of Sichuan and Guizhou plus added Guangdong province in SE China, but without giving detailed information from any of these areas. A hitherto unpublished locality is the Wawu Shan, Sichuan: song recorded and specimen secured there by Bi Zhong-Lin (pers. comm.). Fresh recordings nevertheless do confirm that, locally, *P. emeiensis* is not a rare bird, as demonstrated by Sun Yue-Hua (pers. comm.) on Daliang Shan and in adjacent extreme NE Yunnan. In May, at ten sites in Ebian and Leibo counties in the Sichuan part of Daliang Shan, 10–40 individuals were heard singing, with smaller numbers in other forest plots close by. Density (number of singing males per km^2) was highest in a mix of old secondary and replanted broadleaf forest, with less than half that value in nearby primary broadleaf forest. Even plantings of alien broadleaf species were readily accepted. Probably, therefore, more populations await discovery, but only where low-altitude montane forests have been allowed to persist. Recorded between 1200m

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and 2000m on the Daliang Shan, at 2200m on the Wawu Shan (Sun Yue-Hua pers. comm.) and from 1000m to near 1900m in the Omei Shan type locality. *P. emeiensis* seems mainly, but not exclusively, to be a species of the 'Chinese subtropical forests' EBA (endemic bird area) (Stattersfield *et al.* 1998) which because of its low elevation has suffered much clearance and disruption from logging activities.

Vocalisations: Little described. Territorial song is of the verse type: 'A clear, slightly quivering, straight trill between c. 4 and 6 kHz, usually lasting 3–4s' (del Hoyo *et al.* 2006). Verse syntax follows a simple pattern. Note-groups (syllables) of a verse consist of an isolated downstroke and an upstroke, rarely of just two different downstrokes. Note-groups are repeated up to 15 times to form the verse. More complicated versions include V-shaped notes, rarely inverted, and sometimes verses combine two parts built up of different syllables. Every male displays several verse types; eight were produced by one from the Omei Shan.

Sonagrams are figured by Alström & Olsson (1995).

The *Phylloscopus* [*cantator*] superspecies

Allospecies included: *P. cantator* (Tickell, 1833); *P. calciatilis* Alström, Davidson, Duckworth, Eames, Trong Le, Nguyen, Olsson, Robson & Timmins, 2009; *P. ricketti* (Slater, 1897).

United for the first time here as a superspecies *P.* [*cantator*] these three apparently closely related taxa are allopatrically distributed along the eastern part of the Himalayan chain and, disjunctly, in northern Laos (*cantator*), large parts of China south of the Qin Ling Range, more or less to the Pacific coast (*ricketti*), and more widely in northern Indochina (the newly described *P. calciatilis*). All are species of low altitudes, hardly exceeding 1500 m in the Himalayas and China; and *P. calciatilis* occurs at low altitudes in Vietnam and Laos.

Externally, these three differ in belly colour: white in *cantator*, bright yellow, concolorous with the breast, in *ricketti* and *calciatilis*. In this and other cases, conspicuous yellowness has led to frequent taxonomic errors, finally cleared up only by molecular genetic analysis (Alström *et al.* 2009, Johansson *et al.* 2007, Olsson *et al.* 2005, Päckert *et al.* 2004, 2009a). In earlier tree topologies, *cantator* and *ricketti* emerged as sister taxa (Johansson *et al.* 2007, Päckert *et al.* 2004), but when *calciatilis* was added to the molecular analysis, it was the differently coloured taxa *cantator* and *calciatilis* that turned out as sisters, not concolorous *calciatilis* and *ricketti*. Territorial songs of the three taxa share certain traits but are otherwise species-specific (Alström *et al.* 2009, Päckert *et al.* 2004 [at that stage the latter aware only of two taxa]).

This superspecies stands opposite a large clade comprising *P. occipitalis*, *P.* [*reguloides*], *P.* [*davisoni*], *P. hainanus* and *P. trivirgatus* (Johansson *et al.* 2007, Päckert *et al.* 2009a).

Phylloscopus cantator (Tickell, 1833)

Taxa included (2): *P. c. cantator* (Tickell, 1833) [Barabhum, Lower Bengal, India]; *P. c. pernotus* Bangs & van Tyne, 1930 [Muong Yo, N Laos].

Taxonomy: *P. cantator* emerges as sister to the newly described *P. calciatilis*, with a cytochrome-*b* distance value of 3.54 %. Ssp. *pernotus* was described as an independent species from a single specimen dated 19 May. Ticehurst (1938) revised the type and found no differences from nominate *cantator*, hence synonymised *pernotus* with *cantator*. Mayr *et al.* (1986), Dickinson (2003) and del Hoyo *et al.* (2006) all maintained *pernotus* as a subspecies but I am unaware of the existence of any additional material or possible extension of the *pernotus* range in Southeast Asia, except for sparse data in Fuchs *et al.* (2007) (see also Alström *et al.* 2009).

General characteristics: See above. In the Himalayas, *P. cantator* inhabits only the lower foothills, apparently not breeding beyond the subtropical belt. In the Arun valley of E Nepal, westernmost limit of the known range, it was found in secondary broad-leaved forest just above the extended agricultural valley bottom, between 380 and 500 m altitude. On 21–24 April (skins MTD), birds there were actively singing and reacted strongly to song playback; their gonads well developed. All molecular genetic data published to date (Johansson *et al.* 2007, Olsson *et al.* 2005, Päckert *et al.* 2004, 2009a)

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are based upon the Nepal population, except for Alström *et al.* (2009) who had ssp. *pernotus* samples available. Apparently, no sequence differences have yet been found between these two populations.

Distribution: Southern foothills of the Himalayan chain east from the Arun Valley in E Nepal; also in Manipur and Myanmar. Ticehurst (1938) mentioned examining specimens from Bhamo, Maymyo, northern Shan States, Pyinmana and the Karen Hills. Beyond the Laotian type locality only a few details are available from elsewhere in Southeast Asia (Alström *et al.* 2009). Robson (2000) gave none, and Lekagul & Round (1991) say it is a rare winterer in NW and W Thailand. Possibly, some of Ticehurst's Myanmar localities, but apparently not the *pernotus* type locality, refer to winter range.

Vocalisations (Fig. 9u–v): Territorial song is a short, warbled verse between 1.2 and 1.5s in length, its notes simple up- or downstrokes covering a frequency band of up to nearly 4 kHz, the largest individual note and verse range in the superspecies. Mostly two introductory notes are present, both of narrow frequency range.

Sonagrams are figured in Alström *et al.* (2009), Päckert *et al.* (2004) and Rasmussen & Anderton (2005).

Phylloscopus calciatilis Alström, Davidson, Duckworth, Eames, Trong Le, Nguyen, Olsson, Robson & Timmins, 2009

Taxon included (1): *Phylloscopus calciatilis* Alström, Davidson, Duckworth, Eames, Trong Le, Nguyen, Olsson, Robson & Timmins, 2009 [Phong Nha-ke Bang National Park, Quang Binh Province, Central Annam, Vietnam]. Monotypic

Taxonomy: From both mitochondrial (cytochrome-*b*) and nuclear DNA (ornithine decarboxylase, ODC) sequencing, *P. calciatilis* is most closely related to *P. ricketti* and *P. cantator*, and is believed to be the sister of the latter species. With respect to pattern and coloration these sister taxa are quite different, *cantator* having a white belly whereas it is yellow in *calciatilis*, also in *ricketti*. Cytochrome-*b* sequence differences are at the low end of the values normally accepted as indicating species limits in *Phylloscopus* warblers. They range from 3.54 % between *calciatilis* and *cantator* to 3.79 % between the latter two and *ricketti*. The nuclear ODC gene reveals much smaller values but presents the same inter-taxon relationship as mitochondrial cytochrome-*b*. The authors preferred to describe a new species but they indicate that subspecies status also would hold, placing *calciatilis* and *ricketti* with *cantator* (incl. ssp. *pernotus*) as geographic representatives in a species *P. cantator*. The possibility not addressed by Alström *et al.* (2009), that the three taxa are unitable at superspecies level, is the line followed here. Though a possible hybrid is known from SW China, population interactions at putative range borders are presently unknown.

NB. Though the description of *P. calciatilis* was published in the first issue of *Ibis* for 2010, according to an Editorial Note (*Ibis* 152: 414) that issue had actually been delivered on 14 December 2009. As the Note makes clear, the species name must, therefore, bear the year 2009.

General characteristics: Externally, this novelty 'appears to be indistinguishable from *P. ricketti*' (Alström *et al.* 2009), but this may be due to the small number of skins of *calciatilis* presently available. It is slightly smaller than *ricketti*, with a proportionally larger bill and more rounded wing. In direct comparison, slight coloration differences from *P. ricketti* do also exist. However, measurements and wing formula do clearly separate *calciatilis* (Laos, Vietnam) from *ricketti* sampled on the latter's Chinese breeding grounds.

Distribution: Presently known from central and northern Vietnam and central and northern Laos. It very probably also breeds in southernmost China, with a find in the Nong Gang Nature Reserve of southwest Guangxi province (songs recorded) and a cytochrome-*b* haplotype specimen sampled at Diding Headwater Nature Reserve, also in Guangxi but some 150 km distant. In general, *calciatilis* seems only to have a limited distribution. The species shows a strong affinity with forests on limestone karst mountains, which are

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scattered in SW China, N central Vietnam and N central Laos. All previous *ricketti* records in southernmost China and those beyond Chinese borders in Laos and Vietnam (e.g., Robson 2000) now need re-inspection. Locally, *P. calciatilis* is not rare; apparently healthy populations were found both in protected areas and where karstic mountain outcrop areas are too steep, too sharply rocky (knife-like edges) and too dry for human settlement such that no actual threat to habitat seems to exist.

Vocalisations (Fig. 9x–y): Song and call are diagnostic and differ from those of *P. cantator* and *P. ricketti*. Seven to nine softly whistled notes of varying pitch, duration and structure are given on a slightly falling scale, forming short verses 1.5 to nearly 2.0s in length. Individual notes are simple up- or downstrokes, sometimes V- or inverted V-shaped, similar to those in the songs of *ricketti* and *cantator*. According to Alström *et al.* (2009), *calciatilis* gives the least modulated notes (drawn out more or less horizontally in their sonogram) and its individual notes have the smallest frequency range. Introductory notes are mostly single, of narrow frequency range with a fundamental at 6 kHz or slightly below.

Sonagrams are figured by Alström *et al.* (2009).

Phylloscopus ricketti (Slater, 1897)

Taxon included (1): *P. ricketti* (Slater, 1897) [Kuatun (=Guadun), Fujian, SE China]. Monotypic.

Taxonomy: Originally described as an independent species but its taxonomic fate changed several times. Ticehurst (1938) combined *ricketti* with superficially similar-looking *goodsoni* (type loc. Hainan Island), and treated *P. cantator* separately. Cheng (1987) united both *ricketti* and *goodsoni* as subspecies of *P. cantator*, but *P. goodsoni* has proved to be a member of the *P.* [*reguloides*] superspecies (which see) and is not closely related.

Distribution: A China endemic, occurring south from about the Qin Ling Range with records in Gansu, Sichuan, Guizhou, Hubei, Hunan, Guangxi and Fujian provinces, but may be present in all of S China, mostly below 1200 m. After the description of *P. calciatilis* (which see), however, all *ricketti* records from close to the Vietnamese border need re-inspection.

Vocalisations (Fig. 9w): Territorial song is a short, warbled verse up to 2s in length. Notes are simple up- or downstrokes, sometimes combined as a V-shaped note, all within a frequency band of up to 3 kHz at best, and many notes have a considerably narrower width than that. Introductory notes are mostly two, of narrow frequency range with a fundamental at slightly above 6 kHz, as in *P. cantator* song.

Sonagrams are figured in Alström *et al.* (2009) and Päckert *et al.* (2004).

Southeast Asian and Australasian *Phylloscopus*

In the vast area from the Thai-Malay Peninsula across the Greater and Lesser Sundas, the Philippines, Wallacea, New Guinea and many off-shore islands eastwards to the Solomons occurs a wealth of (presumed) *Phylloscopus* forms that in many cases differ distinctly in their external morphology, even on neighbouring islands. As presently understood, these taxa are everywhere allopatric except in the Philippines where, locally, as on the island of Negros, two or even three species occur. Two of these latter largely separate by altitude although they overlap, including syntopically, at high elevations (Dickinson *et al.* 1991, Kennedy *et al.* 2000). The situation overall may be understood to have resulted from multiple invasions of maritime [=island] Southeast Asia/Australasia which stabilized only in this one spot. Over the vast remaining area leaf warblers are not only spaced by island but frequently also by restriction to mountain tops, from which (as suspected by Parkes 1971) related stocks may be excluded competitively. Presently, they are divided into eight species: *P. trivirgatus, P. poliocephalus, P. cebuensis, P. olivaceus, P. presbytes, P. sarasinorum, P. makirensis, P. amoenus*, and 35 subspecies, although most of this arrangement is understood to be a classificatory convenience rather than a product of thorough taxonomic study. Thus recognising multiple Wallacean and Australasian forms rather than uniting them all under *P. trivirgatus* (Mayr 1944, Parkes 1971) is no more than a convention. The taxa

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involved were partly unified at superspecies level by Mayr *et al.* (1986) but White & Bruce (1986: 346) refused to accede until species-level relationships were better understood. A few of them have been treated as monotypic but most are taken to comprise two to 19 often very distinct subspecies.

Currently, the region's leaf warblers present a largely unresolved taxonomic riddle, quite probably resulting from the Southeast Asian and Australasian archipelagos having been settled at different times and along different routes. First preliminary molecular genetic results (Olsson *et al.* 2005) do not back recently accepted species-limits, but at present we are far from a sound analysis, either molecular genetic or vocal.

Phylloscopus trivirgatus Strickland, 1849

Taxa included (11, all currently valid, occur in our area): *P. t. parvirostris* Stresemann, 1912 [Gunung Tahôn (= Gunung Tahan), Pahang, Malaysia]; *P. t. trivirgatus* Strickland, 1849 [Java]; *P. t. kinabaluensis* (Sharpe, 1901) [Mt. Kinabalu, Sabah, Borneo]; *P. t. sarawacensis* (Chasen, 1938) [Poi Mts., W Sarawak, Borneo]; *P. t. peterseni* Salomonsen, 1962 [Mt. Mataling (= Mantaling), Mantalingajan Range, Palawan, Philippines]; *P. t. benguetensis* Ripley & Rabor, 1958 [Haight's Place, Benguet, Luzon, Philippines]; *P. t. nigrorum* (Moseley, 1891) [Lake Danao, S Negros, Philippines]; *P. t. diuatae* Salomonsen, 1953 [Mt. Hilonghilong, Diuata Mts., Mindanao, Philippines]; *P. t. flavostriatus* Salomonsen, 1953 [Katoan, Mt. Katanglad, Bukidnon province, Mindanao, Philippines]; *P. t. mindanensis* (Hartert, 1903) [Apo Volcano, Mindanao, Philippines]; *P. t. malindangensis* (Mearns, 1909 [Grand Malindang Mt., Misamis Occidental province, Mindanao, Philippines]).

Taxonomy: In urgent need of revision. This is a remarkable high-altitude species split into a multitude of distinct local forms, although current taxonomy does not yet fully describe the complexity of its morphological variation. At the same time, certain of its subspecies (e.g., ssp. *nigrorum*) seem to be closer to those of *P. poliocephalus* (compare figures in del Hoyo *et al.* 2006). The group was revised by Salomonson (1953, 1962) who named three new subspecies. His proposals were accepted by Mayr *et al.* (1986); and Dickinson *et al.* (1991) approved the validity of ssp. *benguetensis*.

The seven subspecies of the Philippines fall into three morphologically defined groups. Parkes (1971) suggested these may represent two (or more) independent species: (i) a western grouping comprising *peterseni* (Palawan), *benguetensis* (Luzon), and *nigrorum* (S Negros); (ii) Mindanao endemics *diuatae* (Mt. Hilong-Hilong), *mindanensis* (Apo Volcano), and *malindangensis* (Grand Malindang Mt); and (iii) *flavostriatus* (Mt Katanglad, N-central Mindanao). At least 13 more 'subspecies' occur south and east of the Philippines, and the taxonomic situation is further complicated by the distribution of the Island Leaf Warbler *P. poliocephalus* (which see)—originally described under *trivirgatus* (cf. Mayr *et al.* 1986) and all of whose representatives are allopatric to *P. trivirgatus* as now defined. *P. poliocephalus* itself seems to be an equally composite species.

Olsson *et al.* (2005) presented a first molecular genetic analysis. In this, ssp. *benguetensis* (from Luzon) did not cluster with nominate *trivirgatus* (from Java) but did so with other 'species' from Australasia, revealing a mosaic of paraphyletic and polyphyletic forms that do more to obscure than clarify the situation.

General characteristics: Morphologically, *P. trivirgatus* as presently understood is a remarkably varied species, a condition quite rare among *Phylloscopus* warblers although other exceptions do exist (see *P. fuligiventer*). Del Hoyo *et al.* (2006) indicated the distinguishing characters of the various subspecies, and very few are confusable. Thus, e.g., ssp. *kinabulensis* from Mt. Kinabalu, NW Borneo, has a lipochrome-less whitish to greyish plumage, reminiscent of juveniles; nominate *trivirgatus* of Sumatra to Sumbawa (the largest range of all *P. trivirgatus* subspecies) has a distinct light coronal stripe; ssp. *nigrorum* from Negros Island has a plain dark cap. On Mt. Kinabalu there is a possibility that two forms which differ in coloration overlap (Sheldon *et al.* 2001, repeated in Mann 2008), but no details nor specimens are yet available.

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Distribution: Spans a vast, mostly insular area from mountainous parts of the Thai-Malay Peninsula, Sumatra, Java, Borneo, the Philippines, Sulawesi to the Lesser Sundas and the Moluccas. Geographical fragmentation involves not only insularity but is strengthened by ecological preferences. All representatives are confined to mountainous habitat, to not below about 800 m a.s.l. on Lombok and Sumbawa (White & Bruce 1986) and the Philippines (Dickinson *et al.* 1991), or below 1300 m in the Thai-Malay Peninsula (Wells 2007). This has produced a mosaic distribution, with mountain tops settled by localised populations that often represent morphologically distinct forms. The point has been made that small, isolated summit areas provide too few different habitat options to support more than one taxon and that, as a result, only one, localised form occurs (Parkes 1971). As indicated, Negros Island, Philippines, is unique in harbouring three apparently vertically spaced but locally overlapping *Phylloscopus* species (Dickinson *et al.* 1991, Kennedy *et al.* 2000).

In the Philippines archipelago as a whole, populations tend to be widely spaced due to the scatter of mountain ranges, and not all apparently suitable areas are actually colonised. No populations have been recorded on Mindoro, Samar, Leyte and Panay, and some other islands are only partially occupied. In the mountains of Luzon and Mindanao on the other hand, additional to recognised subspecies, further distinct but as yet unnamed populations have been found to occur (Kennedy *et al.* 2000). On Luzon, ssp. *benguetensis* is known only in the N-central area, but populations unidentified to subspecies are reported on the NE Coastal Range, in the Bataan to Zambeles Mountains of the W-centre, on Mt. Banahaw in the S-centre, and on Mt. Isarog and Mt. Mayon in the south-east. On Mindanao, all the main mountain blocks have populations. Four names are available (see above) but further variation may occur in the extreme south-east (Mt. Mayo) and south (Mt. Matutum). A real distinction may also exist between the population of Camiguin Sur Island, where there is considerable local endemism, and that of Mt. Hilong-Hilong in the Diuata Range of neighbouring extreme N Mindanao, although E.C. Dickinson (pers. comm.) and del Hoyo *et al.* (2006) subsume both in ssp. *diuatae*. *P. t. malindangensis* is said to occur in two colour morphs (White & Bruce 1986).

Vocalisations: Numerous verbalisations of territorial songs exist, and they are so different that one has to assume morphological differences are paralleled by considerable vocal diversity. This also indicates taxonomic heterogeneity including, perhaps, the existence of a species swarm.

No sonagrams seem to have been published.

Phylloscopus olivaceus (Moseley, 1891)

Taxon included (1): *P. olivaceus* (Moseley, 1891) [Samar and Negros Islands, Philippines; restricted to Samar by Rand & Rabor 1952)]. Monotypic.

Taxonomy: *P. olivaceus* occupies a quite large area of the Philippines but does not display any geographic variation and therefore is thought to be a quite recent invader (Parkes 1971), as opposed to the situation of *P. cebuensis* (see below).

General characteristics: Mayr (1941) placed *P. olivaceus* in the *P.* [*trivirgatus*] superspecies, and Rand & Gilliard (1968) transferred it to *P. trivirgatus* as a subspecies. Of the various localised representatives of *P. trivirgatus* currently recognised, Parkes (1971) claimed that ssp. *maforensis* (from Numfor Island, Geelfink Bay off N New Guinea) is especially close to *P. olivaceus*.

Distribution: Philippine endemic, known from Basilan, Biliran, Bohol, Dinigat, Jolo, Leyte, Mindanao, Negros, Samar, Sanga Sanga, Sipangkot, and Tawi Tawi (Dickinson *et al.* 1991, Kennedy *et al.* 2000). On Negros there is altitudinal overlap with *P. cebuensis* (Kennedy *et al.* 2000), and a subspecies *nigrorum* of *P. trivirgatus* also occurs on Negros. This is the only Southeast Asian island where three apparently closely related tropical *Phylloscopus* species occur sympatrically and, locally, even

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syntopically. Of these, because of its lack of subspecific differentiation, *P. olivaceus* may be the most recent immigrant.

Vocalisations: Apparently not yet adequately described, or transcribed to sonagrams.

Phylloscopus cebuensis (Dubois, 1900)

Taxa included (3): *P. c. cebuensis* (Dubois, 1900) [Cebu, Philippines]; *P. c. luzonensis* Rand & Rabor, 1952 [Massisiat, Abra province, Luzon, Philippines]; *P. c. sorsogonensis* Rand & Rabor, 1967 [Mt. Bulusan, San Roque, Bulusan, Sorsogon province, Luzon, Philippines].

Taxonomy: Despite its restricted distribution within the archipelago there is distinct subspeciation, suggesting that *P. cebuensis* represents old, perhaps now relict stock (Parkes 1971).

Distribution: Philippine endemic, on Cebu and Negros (nominate *cebuensis*), N and central Luzon (ssp. *luzonensis*) and S Luzon (ssp. *sorsogonensis*). It occurs from lowlands to mountains, to about 1800 m. However, on Negros where it overlaps with lowland *P. olivaceus*, it is mainly a higher elevation species occurring sympatrically with *P. trivirgatus* (Kennedy *et al.* 2000).

Vocalisations: Apparently not adequately described yet, or transcribed to sonagrams.

Phylloscopus sarasinorum (A. B. Meyer & Wigglesworth, 1896)

Taxa included (2): *P. s. sarasinorum* (A.B. Meyer & Wigglesworth, 1896) [Bonthain Mts. (= Mt. Lompobatang), S Celebes (= Sulawesi), Indonesia]; *P. s. nesophilus* (Riley, 1918) [Matinan Mts., N Celebes (= Sulawesi), Indonesia] (*P. trivirgatus capitalis* Stresemann, 1931 and *P. t. dryas* Stresemann, 1938, both from Sulawesi, are treated as synonyms by White & Bruce 1986 and Mayr *et al.* 1986).

Taxonomy: In urgent need of revision. Mayr (1944) found nominate *sarasinorum* very close to *P. presbytes*. In Stresemann (1949) the *Phylloscopus* of Sulawesi were given as forms of *P. trivirgatus*, as was usual at that time, but Stresemann noted that within this species they form a 'closed group', and he searched for similarities to the Philippine and Moluccan subspecies groups. A preliminary molecular genetic analysis puts nominate *sarasinorum* in a clade with *P. trivirgatus benguetensis, P. t. guilianetti* and *P. amoenus* (Olsson *et al.* 2005), and these forms show some external morphological similarities (compare images in del Hoyo *et al.* 2006).

General characteristics: Parkes (1971) pointed out that the population *'capitalis'* displays extreme individual variation, from birds with white supercilium and throat, and little ventral yellow to others with yellow supercilium and heavy yellow on the underside.

Distribution: A Sulawesi endemic and the only *Phylloscopus* species known on that island.

Vocalisations: Apparently not adequately described yet, and no sonagrams available.

Phylloscopus presbytes (Blyth, 1870)

Taxa included (2): *P. p. presbytes* (Blyth, 1870) [Timor, Lesser Sunda Islands, Indonesia]; *P. p. floris* (Hartert, 1898) [Flores, Lesser Sunda Islands, Indonesia].

Taxonomy: In urgent need of revision. Previous authors have agreed in concluding that *P. presbytes* is close to *P. sarasinorum*, especially to the population from S Sulawesi (nominate *sarasinorum*), and that it is more distant from *P. trivirgatus* (Mayr 1944, Stresemann 1940a). This was denied by Ticehurst (1938) who suggested the nearest relatives of *P. presbytes* were in S Annam (S Vietnam), a statement heavily opposed by Mayr (1944) who could not accept the accompanying need to shift it to genus *Cryptigata*. Mayr (*loc. cit.*) suggested that *P. presbytes* may be the southernmost member of a chain of populations that starts with ssp. *nigrorum* (and possibly further *P. trivirgatus* subspecies of the Philippines) and includes the two forms of *P. sarasinorum* in Sulawesi. This logic opened the question of where species limits should correctly be drawn. Parkes (1971) suspected that the 'checkerboard distribution' of the various distinct *trivirgatus* subspecies would be explainable if it were postulated that this complex comprised more than one species.

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General characteristics: From not too large a series of the nominate ssp., Mayr (1944) found that lowland and mountain birds (from 300 m *vs.* 1800–2300 m altitude) differed in size, and stated that there is definitely no mensural overlap. He also pointed to possible geographical colour variation within Timor. The morphological break between *P. presbytes* on Flores and *P. trivirgatus* ssp. on neighbouring Sumbawa is striking (Stresemann 1940a, White & Bruce 1986) and Stresemann (1940a) concluded that *P. trivirgatus* had penetrated along the Lesser Sunda Island chain eastward from Java only to Sumbawa while *P. presbytes* had reached Flores and Timor from Sulawesi in the north.

Distribution: Generally understood to be restricted to Flores and Timor (including offshore islands Atauro and Roti) of the SE Lesser Sundas.

Vocalisations: Apparently not yet described in terms of sonagrams.

***Phylloscopus poliocephalus* (Salvadori, 1876)**

Taxa included (5): *P. p. everetti* Hartert, 1899 [Mt. Mada, Buru, S Moluccas, Indonesia]; *P. p. waterstradti* Hartert, 1903 [Batjan (=Bacan), N Moluccas, Indonesia]; *P. p. henrietta* Stresemann, 1931 [Gamkonora Mt., N Halmahera, N Moluccas, Indonesia]; *P. p. ceramensis* (Ogilvie-Grant, 1910) [Mt. Karobi, Ceram (=Seram), S Moluccas, Indonesia]; *P. p. avicola* Hartert, 1924 [Mt. Daab, Great Kai Island, S Moluccas, Indonesia.]. An additional 14 subspecies are EL, occurring in New Guinea and on outlying islands east to the Solomons Islands.

Taxonomy: In urgent need of revision. Descriptions and images in del Hoyo *et al.* (2006) point to the multitude of localised (allopatric) forms (19 subspecies presently regarded as valid: del Hoyo *et al.* 2006, Mayr *et al.* 1986) as being an artificial construct. Mayr *et al.* (1986) believed *P. poliocephalus* to form a superspecies with *P. trivirgatus*, *P. sarasinorum*, *P. presbytes* and *P. makirensis*, an enticing view as all of their forms are allopatric and may well have originated from a common stock. But Mayr *et al.* (1986) also speculated that 'a thorough revision may raise several additional subspecies, on islands around New Guinea, to the rank of allospecies'. Initial molecular genetic results (Olsson *et al.* 2005) point to a rather complicated picture that does not back traditional taxonomy, but taxon sampling was too selective for the drawing of more generalised conclusions. Multiple invasions and long independent evolution may have led to the present distributional picture of such varied island and mountain-top forms. This assumption is supported by differing altitudinal distributions on the various islands of the *P. poliocephalus* range (Bowler 2009 and literature cited therein).

General characteristics: Of isolated insular and exclusive mountain-top occurrence, with some variations. Only one ssp., *matthiae* (EL), occurs in lowland habitat (see Bowler 2009 for more information).

Distribution: Archipelagos east of Sulawesi, centred on New Guinea and outlying islands to the west, north, and east as far as the Solomon Islands. Nineteen subspecies are presently accepted, some of them comprising tiny populations on minute islands or mountain summits (del Hoyo *et al.* 2006).

Vocalisations: Verbal descriptions (del Hoyo *et al.* 2006) depict quite a variety of song types, perhaps signalling the inclusion of unrelated forms. Rheindt & Hutchinson (2007) described differences in the pattern of territorial song (and of external morphology) between subspecies *ceramensis* and *everetti* on the neighbouring islands of Buru and Seram (Moluccas)—a hint at long-independent evolution.

Sonagrams are figured by Rheindt & Hutchinson (2007; ssp. *ceramensis* and ssp. *everetti*).

Genus *Seicercus*

Hartert (1907–1909) differentiated *Seicercus* (then called *Cryptolopha* Swainson) from *Phylloscopus* by its broad bill, similar to that of flycatchers, strongly developed rictal bristles at base of bill, nostrils covered by bristles, and roundish wings. He remarked that some *Phylloscopus* approached *Seicercus*, but they are never as broad-billed, and nostril bristles are less developed. Nests are domed (as in *Phylloscopus*), and eggs generally plain white. In keeping

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with this rather imprecise generic definition, *Seicercus* turned out to be polyphyletic. All of its species form part of the *Phylloscopus* molecular phylogenetic tree topology, but are dispersed to more than one branch (Olsson *et al.* 2004, Päckert *et al.* 2004), signifying splits to levels deeper than species [the generic type species of *Seicercus* is *Cryptolopha auricapilla* Swainson = *Sylvia Burkii* Burton = *Seicercus burkii* (Burton)]. Ernst Mayr (Mayr *et al.* 1986: 256) was of the opinion that 'Justification of the genus *Seicercus* is rather questionable. The included species seem to be nothing but tropical *Phylloscopus*'. Nevertheless, *Seicercus* is to be maintained until a sound and detailed molecular phylogeny of *Phylloscopus* and *Seicercus* together has been worked out. Only then can objective generic (and/or subgeneric) boundaries be set for the complex as a whole.

Presently, we distinguish two monophyletic groupings: the *Seicercus burkii* complex of 'golden-spectacled' warblers and the morphologically quite different *S. castaniceps* complex comprising considerably smaller birds with a marked rufous head pattern. As already noted, *'S'. xanthoschistos* has proven to be part of the *Phylloscopus davisoni* complex (Johannson *et al.* 2007, Martens 2005, Olsson *et al.* 2004, Päckert *et al.* 2007) and is no longer treatable as a *Seicercus*.

The *Seicercus burkii* complex

The 'golden-spectacled warbler' complex comprises a monophyletic group of species most of which are confusingly similar in external morphology. With one exception (*S. poliogenys*), they have vivid green upperparts and bright yellow underparts, and a yellowish (in rare cases whitish) eye ring occurs throughout. Most taxa were disentangled only recently, from vocalisation and molecular genetic data (Alström & Olsson 1999, 2000, Martens *et al.* 1999, Olsson *et al.* 2004, Päckert *et al.* 2004). The currently recognised eight species of the complex are distributed all along the Himalayan chain including SE Tibet, to large stretches of mountainous country from the eastern rim of the Tibetan plateau all across the southern half of China and large parts of eastern Indochina. The distributional core is SW China where up to four species may live on a single mountain slope whereas, so far, not more than two have been found together elsewhere in the collective range. The distributional map in Cheng (1987), the first detailed reference to the complex, is small scale but shows the areas of occurrence at least of the various Chinese forms interdigitating in a way not expected of subspecies. Two simultaneously published revisions of the *Seicercus burkii* complex (Alström & Olsson 1999, Martens *et al.* 1999) revealed *S. 'burkii'* as a taxonomically highly complicated composite, elevated most its then current subspecies to species rank and described two species new to science: *S. omeiensis* and *S. soror*. Most of these taxa are now generally accepted as independent (del Hoyo *et al.* 2006).

The lesson for systematists was that radiation and speciation in *S. burkii sensu lato* had been much richer and more extensive than ornithologists had previously imagined, and that molecular genetics and vocalisations had diverged far more profoundly than external morphology. All accepted species in fact do differ on constant physical characters, but these are minor and can sometimes be difficult to discriminate. By contrast, voice has diverged strongly between species, although similarities are still detectable at allospecies level within superspecies.

Most intriguing ecologically is that whereas it is rare for more than one golden-spectacled warbler species to occur in a given stretch of forest, they regularly live in vertical allopatry. Albeit unwittingly, this was first noticed by Gerd Heinrich on Mt. Victoria, Burma, where within one week in late March—probably close to the beginning of the breeding season—he found two 'subspecies' of *Seicercus 'burkii'* in vertical parapatry, one at 2500–2800 m, the other one at 1400 m (Stresemann & Heinrich 1940). Typically, the local set of species is stacked altitudinally, with sharp lines of contact along the gradient, a remarkable fact first hinted at directly by Beaman (1994) from the data of P. Alström. Within China, the order of this vertical packing or stacking of species

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is always alike, or at least similar: *S. valentini* at the top followed downwards by *S. omeiensis*, then either *S. soror* or *S. tephrocephalus*, one or other of the latter two being the lowest species. In addition, locally, *S. affinis* is intercalated into the species set, as on Omei Shan in Sichuan (Martens *et al.* 1999). East of Sichuan and south of southern Shaanxi (Taibai Shan), species sets are largely unrecorded but due to the generally lower elevation of mountain summits are unlikely to be of more than two species, or three at best. In the SE Chinese mountains, especially on the extended Wuyi Shan chain (highest point Huanggang Shan, at 2157 m) representation of the *S. burkii* species swarm appears to be limited to *S. valentini latouchei*, *S. soror* and *S. tephrocephalus*. Altitudinal packing there follows the general SW China pattern but seems to be less distinctly sorted. On Huanggang Shan, *S. soror* lives only in the foothills, probably not above about 850 m altitude, *S. valentini* extends to near 1850 m, close to the upper forest limit (the rest of the summit area being open grassland) (author's unpublished observation), while *S. tephrocephalus* has been found there only once, but at 1800 m, surprisingly high for this species (P. Holt pers. comm.). Detail from other S and SE Chinese mountain blocks is still awaited while in the Himalayas *S. burkii sensu stricto* is the lower-stratum species, *S. whistleri* the upper one. Within this system, relatives ranking as allospecies of a superspecies are generally remotely allopatric (thus, *S. whistleri/S. valentini*; *S. burkii sensu stricto/S. tephrocephalus*).

Exceptionally, local co-occurrence during the breeding season does occur. Thus three species, *S. tephrocephalus*, *S. soror*, and *S. omeiensis*, were found at the same altitude, 1300 m, in the Qincheng Shan near Dujiangyan, Sichuan (Martens *et al.* 2003; skins at MTD Dresden). In autumn, with the onset of migration to winter quarters, vertical partitioning is abandoned generally, and established anew during the following spring. How the fine-tuning of this annual spacing between species is achieved, on the other hand, is an open question.

The *Seicercus* [*burkii*] superspecies

Allospecies included (2): *S. burkii* (Burton, 1836) *sensu stricto*, *S. tephrocephalus* (Anderson, 1871).

This group includes two species of lower slopes, in the central and eastern Himalayas (*S. burkii sensu stricto*) and SW China, W Burma and N Vietnam (*S. tephrocephalus*). Shared characters include a sharply outlined black lateral coronal stripe and trill-rich territorial songs. Taxa are strictly allopatric and in the molecular genetic tree topology emerge as sister species (Johansson *et al.* 2007, Olsson *et al.* 2004, Päckert *et al.* 2004), opposite another taxon pair *S. affinis* (and its geographically scattered relatives) and *S. poliogenys*. These latter probably also rank as a superspecies (Olsson *et al.* 2004), although not treated as such here.

Seicercus burkii (Burton, 1836) *sensu stricto*

Taxon included (1): *S. burkii* (Burton, 1836) ['apud montes Himalayenses', restricted to Sikkim by Ticehurst 1925]. Monotypic.

Taxonomy: This is what remained after the revisions of Martens *et al.* (1999) and Alström & Olsson (1999) had dispersed the contents and most of the geographical range of a complex previously subsumed under the name *burkii*. As noted, in the molecular genetic tree topology *S. burkii* is a sister taxon of *S. tephrocephalus*.

General characteristics (Plate 6a–b): This species has bright green upperparts, a median crown stripe predominantly green, only lightly interspersed with individual grey feathers (MAR 2730), and a sharply outlined lateral crown stripe strikingly set off in black. The vanes of the two outer rectrices (R6 and R5) are extensively white (white sometimes extending slightly onto R4; photo images in Martens *et al.* 2003).

Distribution: A Himalayan endemic, but due to the former confusion with sympatric *S. whistleri* its range boundary is imperfectly defined, especially in the west. Westernmost skin records of *S. burkii sensu stricto* are from Garhwal (Irani, 30 June 1914, and Dsoli/Targ Valley, 23 May 1925, at NHM Tring). Eastward, it extends south of the Brahmaputra into the Garo Hills of Meghalaya, NE India (skin in the Koelz collection, MMNH Ann Arbor) and

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to SE Tibet (Alström & Olsson 2000). In the Himalayas proper, *S. burkii* is sympatric with, but altitudinally partitioned from, *S. whistleri*, the latter species always occupying the upper area. Their line of contact is sharply defined and at it both species may be heard singing at the same time (Martens *et al.* 1999). These two are neither phylogenetically nor acoustically close (Martens *et al.* 1999).

Vocalisations (Fig. 10a): Territorial song comprises a richly varied repertoire of verse types (up to 13 and 17 in two individual males), although verses may regularly repeat syllables (blocks of several notes) or dense trills. Of the eleven syntax patterns recorded in the *burkii* complex as a whole, eight were found in *S. burkii sensu stricto*. Most prominent is the pattern ABAB and ABABCCCCC, 'A' and 'B' representing differing notes, 'C' indicating a rapid trill (Martens *et al.* 1999, Päckert *et al.* 2004). An introductory note is generally absent (but present in the sister species, *S. tephrocephalus*). Calls are simple, steeply ascending notes covering nearly 4 kHz of frequency range (Martens *et al.* 1999).

Sonagrams are figured in Alström & Olsson (1999), Martens & Eck (1999; Fig. 84a–m, a'–l'), Martens *et al.* (1999, 2000, 2003, 2011), Päckert *et al.* (2004), Rasmussen & Anderton (2005).

Seicercus tephrocephalus (Anderson, 1871)

Included taxon (1): *S. tephrocephalus* (Anderson, 1871) [Bhamo, Burmah (= Myanmar)]. Monotypic.

Taxonomy: Alström & Olsson (1999) called this taxon *S. tephrocephalus* but Martens *et al.* (1999) named it *S. distinctus*. The main reason for the difference was that La Touche (1922b) had described a taxon [*distinctus*] from Mengtz, SE Yunnan, with clear-cut black coronal stripes and small wing and tail measurements (relative to *C. b. tephrocephalus* 'smaller, upper head contrasting in colour; eye ring narrow'). These characters hold true for the neotype established by Alström & Olsson (1999), but the excellent colour drawing by J. G. Keulemans in Anderson (1878, Plate L) does not depict the taxon as understood by Alström & Olsson (1999). In other words, their neotype designation for *S. tephrocephalus* appears not to conform with

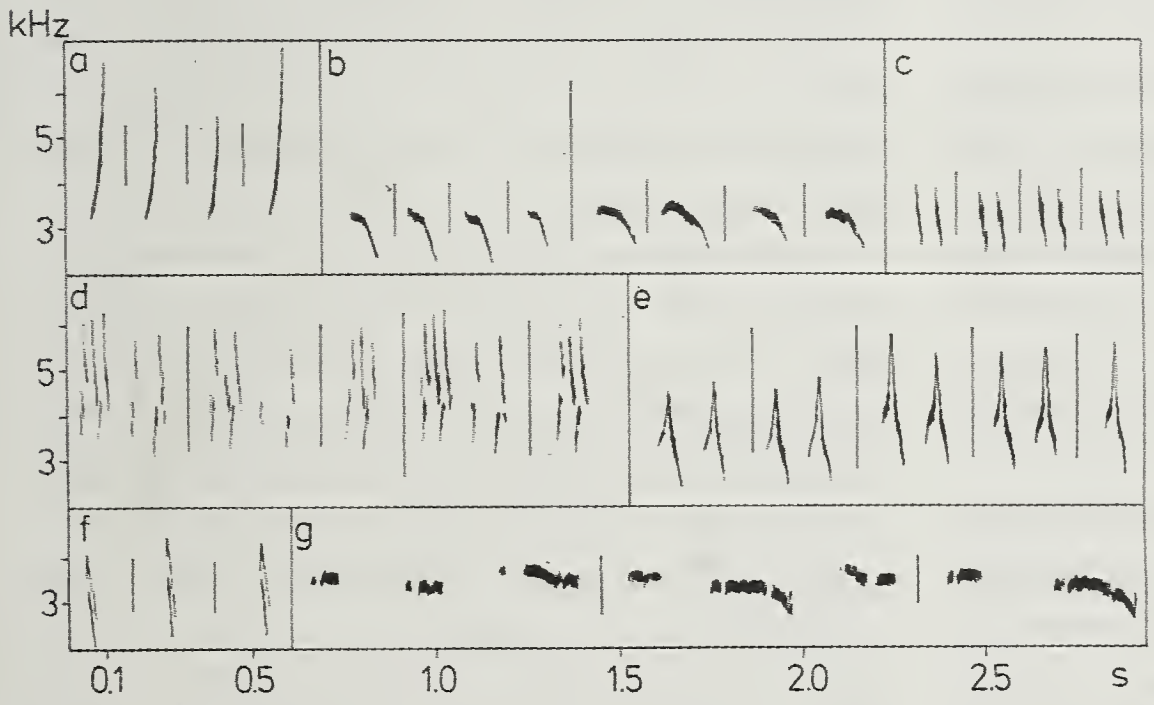

Figure 10. *Seicercus burkii* complex calls:

a) *S. burkii sensu stricto*: Nepal, Sankhua Sabha Distr.;
b) *S. valentini valentini*: China, Shaanxi, Taibai Shan (left four calls), Sichuan, Omei Shan (right four calls);
c) *S. tephrocephalus*: China, Shaanxi, Taibai Shan;
d) *S. soror*: China, Sichuan, Omei Shan;
e) *S. whistleri*: Nepal, Panchthar Distr. (two left element groups), Dolpa Distr. (three right element groups);
f) *S. omeiensis*: China, Shaanxi, Taibai Shan;
g) *S. affinis* ssp.: China, Omei Shan, Sichuan.

(Recordings: J. Martens (modified from Martens *et al.* 1999)).

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Anderson's original type material and intention (Martens *et al.* 2003). Moreover, the specimen they chose (AMNH New York 450451, from Sinlum, Bhamo) is old, dated 12 May 1908, and of unknown genotype or voice—notable flaws in such a taxonomically difficult group of passerines (see Peterson *et al.* 2007). Martens *et al.* (2003) pointed to the misinterpretation (although see del Hoyo *et al.* 2006: 676) but for the sake of stability accepted Alström & Olsson's nomenclatural act. The name *tephrocephalus* has since come into universal use for the low-altitude sister taxon of *S. burkii sensu stricto.*

General characteristics (Plate 7a–b): The smallest species of the *S. burkii* complex, wing length 49.5–57 mm (males; x=53.7, se=2.09); 48.5–53 mm (females; x=51.3, se=1.89). For tail/wing indices see Martens *et al.* (1999). Lateral crown stripe black and sharply outlined, coloration between this stripe and the eye grey.

Distribution: *S. tephrocephalus* is subtropical, in China occupying the lowest position in the altitudinal chain of *Seicercus* species. Widely distributed but, apparently, occurs only in scattered, localised populations. Identified (by specimens) from Sichuan (Qincheng Shan, skins at MTD Dresden), Shaanxi (on the southern flank of Taibai Shan, skins at MTD), Sichuan (various localities, song recordings), Hubei (at Shennongia Biological Station of the Chinese Academy of Sciences, Beijing, skin at MTD), Jiangxi (Huanggang Shan; P. Holt pers. comm., voice recording), Yunnan, NE India, NW Burma (skins at MTD), and N Vietnam (del Hoyo *et al.* 2006, Martens *et al.* 1999, Olsson *et al.* 2004).

Vocalisations (Fig. 10c): Territorial song strongly varied, exhibiting six main syntax patterns. Most prominent among these is the repetition of a simple element group ABAB, a varied note-group combined with a double note ABABCC, a note-group with an attached trill ABABCCCC, and finally a simple, rapid trill AAAAA (Martens & Eck 1995, Martens *et al.* 1999, Päckert *et al.* 2004). In this richness of pattern and the many notes involved it resembles its closest relative, *S. burkii sensu stricto.* Every verse is preceded by one or two introductory notes (lacking in *S. burkii* and in the otherwise vocally similar *S. omeiensis*). Calls are double notes, descending but within a frequency range of less than 2 kHz (Martens *et al.* 1999, *S. distinctus*).

Sonagrams are figured in Alström & Olsson (1999), Martens & Eck (2000), Martens *et al.* (1999, 2003, 2011), Päckert *et al.* (2004).

The *Seicercus* [*valentini*] superspecies

Allospecies included (2): *S. valentini* (Hartert, 1907), *S. whistleri* Ticehurst, 1925.

This comprises the two species of the uppermost altitudinal zone of the *S. burkii* complex, respectively in China (*S. valentini*) and the Himalayas (*S. whistleri*). The characters they share include relatively large size and being 'non-trillers' that completely lack trill parts in the territorial song. Their ranges are strictly allopatric and in the molecular genetic tree topology they emerge as sister species, on mt genes opposite only *S. soror* (Olsson *et al.* 2004, Päckert *et al.* 2004) but on mt plus nuclear genes opposite the taxon pair *P. soror* and *S. omeiensis* (Johansson *et al.* 2007).

Seicercus valentini (Hartert, 1907)

Included taxa (2): *S. v. valentini* (Hartert, 1907) [Taibai Shan, Qin Ling mountain range, Shaanxi, China]; *S. v. latouchei* Bangs, 1929 [Kuatun (=Guadun), NW Fohkien (=Fujian province), China].

Taxonomy: Upgraded to species status on evidence of external morphology, especially size, vocalisations and molecular genetics (Alström & Olsson 1999, del Hoyo *et al.* 2006, Martens *et al.* 1999, Olsson *et al.* 2004, Päckert *et al.* 2004). The largely disjunct SE Chinese taxon *latouchei*, synonymised with *valentini* by Mayr *et al.* (1986), was treated as a valid subspecies by Alström & Olsson (1999) and Olsson *et al.* (2004), and has been corroborated as such on genetic evidence. Ssp. *latouchei* and nominate *valentini* are said to differ vocally but no proof of this is available as yet. The cytochrome-*b* gene distance of *S. valentini* from its geographic representative in the Himalayas, *S. whistleri* (which see), amounts to 8.8%. At the same time, nominate *valentini* and ssp. *latouchei* differ by a distance of only 0.5–1.0%, not more than a

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population to 'good subspecies' value (Olsson *et al.* 2004).

General characteristics (Plate 6e–f): Within the *burkii* complex, this is a largish species and has the longest wing: up to 65 mm compared with up to 62 mm in *S. whistleri* (Martens *et al.* 1999, 2003). The eye-ring is relatively broad, regular and complete (photo image in Martens & Eck 2000), lateral crown stripe is dark greyish and irregularly outlined, the median stripe grey; and inner vanes of the two outer rectrices show white markings.

Distribution: A Chinese near-endemic. Nominate *valentini* is distributed mainly in the mountain ranges of SW China, with records from S Gansu, Sichuan and Shaanxi (plus, according to del Hoyo *et al.* 2006, Yunnan). There, it always inhabits higher elevation coniferous forest and is consistently the uppermost member of the altitudinal species chain. As a result, its distribution is split into a multitude of small, isolated subunits—for the genetic consequences of which see Päckert *et al.* (2004). Ssp. *latouchei* is confined to the SE and S Chinese coastal mountains of Fujian (including the type locality), Jiangxi (Huanggang Shan, author's unpublished observation), Guangdong and, according to del Hoyo *et al.* (2006), Hubei, also northernmost Vietnam (Olsson *et al.* 2004). Although locally its altitudinal position is unclear it apparently occupies the upper distributional level on the relatively low mountain chains of S China. On Huanggang Shan (summit 2157 m), Jiangxi, a part of the Wuyi Shan chain, it occurs up to about 1800 m, where the local treeline is situated at 1850 m.

Vocalisations (Fig. 10b): This is a 'non-triller' species and syntax of territorial songs is always a sequence of note-groups (syllables) which are repeated once, following the pattern ABAB or ABCABC. A short introductory note of small frequency range always precedes the verse. The descending call note is also narrow band. According to sonagrams in Alström & Olsson (1999) these characteristics apply to both nominate *valentini* and ssp. *latouchei*. General structure of territorial song is very similar to that of *S. whistleri* (see below). Slight differences include a lowering of the *valentini* song by about 0.5 kHz relative to *whistleri* across its whole frequency range (Martens *et al.* 1999, Päckert *et al.* 2004). Martens *et al.* (1999) described differences in calls between Shaanxi and Sichuan populations.

Sonagrams are figured in Alström & Olsson (1999), Martens & Eck (2000), Martens *et al.* (1999, 2011), Päckert *et al.* (2004).

Seicercus whistleri Ticehurst, 1925

Included taxa (2): *S. w. whistleri* Ticehurst, 1925 [Dharmsala, Punjab, N India]; *S. w. nemoralis* Koelz, 1954 [Sangau, Lushai (= Mizo) Hills, Mizoram, NE India].

Taxonomy: Treated as an independent species by Alström & Olsson (1999) and Martens *et al.* (1999). Currently, *S. whistleri* is considered to be polytypic, with nominate *whistleri* covering the Himalayan chain and probably SE Tibet, and ssp. *nemoralis* in the hills south of the Brahmaputra and W Burma (Olsson *et al.* 2004). Colour differences between them are not constant and tail-length as a percentage of wing-length has proved to be a slightly better diagnostic feature, though still with noticeable overlap (*whistleri*: 79–88%, x=83.4; *nemoralis* 83–92%, x=86.9: Martens & Eck 2000, Martens *et al.* 1999). The molecular genetic (mitochondrial gene-based) distance value between nominate *whistleri* and ssp. *nemoralis* amounts to a surprisingly large 1.4–2.0% (Olsson *et al.* 2004) and hints at a considerable period of mutually independent development.

General characteristics (Plate 6c–d): Median crown-stripe green, to a variable extent intermixed with grey feathers (photo images in Martens *et al.* 2003), and green below the blackish lateral crown-stripe; eye-ring complete, broadest posteriorly and thinnest above eye; yellow of underparts delicately tinted orange, most distinct in ssp. *nemoralis*; and inner vanes of the three outer rectrices show extended white markings.

Distribution: A Himalayan endemic with eastern outliers. Nominate *whistleri* ranges from Pakistan (where local: Roberts 1992) and Indian Kashmir (once, on 10 June: Dickinson 1966) all along the Himalayan chain to far-eastern India and SE Tibet. Olsson *et al.* (2004) limited ssp.

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nemoralis to W Myanmar, Mizoram and adjacent areas southeast of the Brahmaputra River. The affiliation of far-W Himalayan populations to *S. whistleri* is not yet backed by molecular genetic evidence but is likely on the principle that *S. burkii sensu stricto*, the only other Himalayan species of the *burkii* complex, has never been found in the western Himalayas whereas *S. whistleri* has. A genetically distinct eastern haplotype lineage associated with the name *nemoralis* is based on just two specimens from W Myanmar, taken at approximately 22°N and 24°N (Olsson *et al.* 2004).

Vocalisations (Fig. 10e): *S. whistleri* is a 'non-triller'; its territorial song is composed strictly of note-groups following the pattern ABAB, ABCABC or ABABCDCD. Verses are generally short and always preceded by a brief, descending introductory note. The call note ranges between 2.5 and 3.0 kHz and has an inverted V-shape, thus differing markedly from that of all other *Seicercus burkii*-complex species.

Sonagrams are figured in Alström & Olsson (1999), Martens & Eck (1995 [calls in Fig. 84m'], 2000), Martens *et al.* (1999, 2003, 2011), Päckert *et al.* (2004), Rasmussen & Anderton (2005).

Seicercus omeiensis Martens, Eck, Päckert & Sun, 1999

Included taxon (1): *S. omeiensis* Martens, Eck, Päckert & Sun, 1999 [Omei (= Emei) Shan, Sichuan, China]. Monotypic.

Taxonomy: This recently described species was erected on a combination of external morphology, vocalisations and molecular genetics. In the molecular genetic tree topology *S. omeiensis* takes a basal position within its clade, opposed to *S. soror, S. whistleri* and *S. valentini*, the latter two being closely related sisters (see above; Martens *et al.* 1999, Olsson *et al.* 2004, Päckert *et al.* 2004). A combination of mitochondrial and nuclear genes places *S. omeiensis* opposite *S. soror*, but without strong support (Johansson *et al.* 2007).

General characteristics (Plate 7e–f): Median coronal stripe grey, lateral stripe dark grey and irregularly outlined; eye-ring complete but among the narrowest found within the *burkii* complex (photo image in Martens & Eck 2000). The bright yellow breast shows light traces of orange and the inner vanes of the two outer rectrices bear white markings. Very similar morphologically to *S. valentini* although not closely related to it, being smaller and more delicate-looking, with thinner bill and shorter wings (up to 59 mm in males). It also has different vocalisations and there are clear molecular genetic differences. Within the SW Chinese *Seicercus* assemblage *omeiensis* occurs at mid altitudes, in broad-leaf forest with only a small coniferous element, and always below the *valentini* occupation zone (though they sometimes occur syntopically on their line of contact (Martens *et al.* 1999, 2003).

Distribution: A small-range Chinese endemic. When first described, *S. omeiensis* was known from just two localities: Omei Shan in Sichuan and the southern slope of Taibai Shan in Shaanxi. This situation has changed only a little since. Its stronghold now appears to be southern Sichuan from were there are a number of records south to 28°42'N, slightly north of Meigou at 103°02'E. Adjacent to E Sichuan it is also common in parts of Hubei with records east to Zhashuping, 30°48'N 109°58E (skins at MTD Dresden). Occurrence in N Yunnan is to be expected. It is further possible that the *S. omeiensis* range is bipartite, with a separate, disjunct southwestern sector in NW Burma (including Mt. Victoria, Mt. Popa, and Dudaw Taung) (Martens *et al.* 1999, 2003). Specimens from this area collected in 1939 as late as 15 and 16 April (skins at NHM Tring) have upperparts tinged yellowish, in vivid contrast to birds from the Chinese breeding area (photo image in Eck & Töpfer 2005). Breeding records from Myanmar are still lacking but a distinct local population is likely there. No Myanmar breeding-stage specimen has yet been genotyped.

Vocalisations (Fig. 10f): Territorial song is highly variable and includes a multitude of syntax structures, among them repetitions of note-groups ABAB or ABCABC, or double groups ABABCDCD. Such individual verses are often also followed by trills (this is a 'triller' species). The auditory impression is very similar to *S.*

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tephrocephalus, but the latter's song is preceded by an introductory note. This can be hard to identify in the field but is always absent from *omeiensis* song (Martens *et al.* 1999, 2003, Päckert *et al.* 2004). The *omeiensis* call is an extremely short double structure, the first component descending, the second one ascending and then falling (Martens *et al.* 1999).

Sonagrams are figured in Alström & Olsson (1999: '*S. tephrocephalus*' from Omei Shan, Sichuan), Martens & Eck (2000), Martens *et al.* (1999, 2003, 2011), Päckert *et al.* (2004).

Seicercus soror Alström & Olsson, 1999

Included taxon (1): *S. soror* Alström & Olsson, 1999 [Hopiachen, Sichuan, China]. Monotypic.

Taxonomy: Recently described from morphology and vocalisations by Alström & Olsson (1999), contemporaneously from molecular genetics by Martens *et al.* (1999 [under the name *S. 'latouchei'*]), Olsson *et al.* (2004) and Päckert *et al.* (2004). In the molecular tree topology, *S. soror* either takes a position opposite *S. whistleri* and *S. valentini* (Olsson *et al.* 2004) or is basal to *S. omeiensis*, *S. whistleri* and *S. valentini*, the latter two again forming a sister group (Päckert *et al.* 2004). Alternatively, based on mitochondrial plus nuclear gene data, it forms a sister taxon to *S. omeiensis*, although with little statistical support (Johansson *et al.* 2007).

General characteristics (Plate 7c–d): Median coronal stripe grey, lateral stripe matt black, not sharply delimited; eye-ring narrow but complete; outermost rectrix (R6) with white marking on the inner vane, reduced to a tiny terminal spot on R5 (colour photo image in Martens & Eck 2000). Distributed lowest in the SW Chinese altitudinal stack of *Seicercus*, but its breeding grounds are still always in mountainous areas. Locally, *S. tephrocephalus* may settle just as low, or even slightly lower, but only two such areas have been found so far: Taibai Shan (Shaanxi) and Qincheng Shan (Sichuan; where *S. soror* and *S. tephrocephalus* occur syntopically during the breeding season) (Martens *et al.* 1999, 2003).

Distribution: A Chinese endemic, occurring in two apparently disjunct areas: mountainous SW China, with skin and voice records from Sichuan (including the type locality), Shaanxi (on the southern slopes of Taibai Shan), Guizhou (Martens *et al.* 2003), Fujian (Alström & Olsson 1999), and on the lower slopes of Huanggang Shan, Jiangxi (P. Holt, pers. comm.); recently also from Henan (Song Shan, 60 km south-west of Zhengzhou; skin at MTD Dresden).

Vocalisations (Fig. 10d): This is a 'non-triller' species. Territorial song verses follow the note patterns ABAB and ABCABC, rarely ABCDABCD, and every verse is preceded by a short introductory note. In these song characters *S. soror* is very similar to *S. valentini* and *S. whistleri*, but the *soror* frequency range is considerably greater and within a note-group (syllable) frequency often rises (Alström & Olsson 1999, Martens *et al.* 1999, 2003, Päckert *et al.* 2004).

Sonagrams are figured in Alström & Olsson (1999), Martens & Eck (2000, [*S. 'latouchei'*]), Martens *et al.* (1999 [*S. 'latouchei'*], 2011), Päckert *et al.* (2004).

Seicercus affinis (Hodgson, 1854)

Included taxa (3): *S. a. affinis* (Hodgson, 1854) [Nepal]; *S. a. intermedius* (La Touche, 1898) [Fohkien (= Fujian province), SE China]; *S. a. ocularis* Robinson & Kloss, 1919 [Lang Bian Peaks, southern Vietnam].

Taxonomy: Within the *burkii* complex as a whole this is the least satisfyingly resolved species, largely because of the poorly known nature of its widely disjunct populations, partly also for lack of genetic samples and voice recordings. Among the disjunct populations of which samples have been sequenced several deep genetic splits were uncovered. These let us suppose that '*S. affinis*' has had a complicated evolutionary history and that species-limits may not yet have been correctly drawn (Olsson *et al.* 2004). Interior Chinese and S Vietnamese populations show mitochondrial genetic distance values of 0.8 % to 2.5%, i.e., differences that approach species level—the largest to date (2.5%) being between the isolated Omei Shan (Sichuan) population and ssp. *intermedius* from Fujian, SE China. Fujian and neighbouring Guangdong populations are nearly as different

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(2.3%), whereas almost equally remotely spaced Guangdong and Sichuan birds show only a 0.8% difference, implying they are allied down to population-level. The Omei Shan population is currently un-named but it may be close to Himalayan nominate *affinis*, although the latter's genetics and vocalisations are still uninvestigated. The distance of all tested Chinese populations to the remote and isolated S Vietnamese ssp. *ocularis* is uniformly 1.5% to 1.9% (Olsson *et al.* 2004).

On the molecular genetic tree topology (mt and nuclear) those populations of *S. affinis* that have been analysed lie opposed to *S. poliogenys*, and this group is sister to *S. burkii sensu stricto* and *S. tephrocephalus*, another sister pair (Johansson *et al.* 2007, Olsson *et al.* 2004, Päckert *et al.* 2004).

General characteristics (Plate 8a–d): Head pattern varies individually and geographically. In the Fujian/Jiangxi population the median coronal stripe is grey or green (colour morphs according to v. Jordans & Niethammer 1994, Olsson *et al.* 2004, Stresemann 1940), and the lateral coronal stripe is matt grey. The area between lateral stripe and eye is green in Fujian/Jiangxi but grey in S Vietnam (ssp. *ocularis*). The eye-ring is broken dorsally in all populations considered but otherwise varies: broad in Sichuan, even broader in Fujian/Jiangxi (personal observation; see also Alström & Olsson 2000, Fig. 2), yellow in Sichuan and Fujian/Jiangxi but pure white in the Himalayas (Hartert 1907–1909) and in S Vietnam (photo image in Rheindt 2006).

Distribution: As presently understood, highly disjunct. Nominate *affinis* is E Himalayan and NW Burmese, but in its type locality, 'Nepal', has not been found for decades, at least not during the breeding season (Inskipp & Inskipp 1991). Sichuan, Yunnan (Cheng 1987: 824), Fujian (type locality of ssp. *intermedius*), Jiangxi (author's unpublished observation) and Guangdong populations all seem to be largely disjunct, and S Vietnamese *ocularis* is the most remotely isolated subspecies. In the four-species stack of *Seicercus* on Omei Shan (see also *S. soror, S. omeiensis, S. valentini*) *affinis* occupies medium altitudes, within the *omeiensis* belt and in places these two occur side by side. On the Huanggang Shan, Jiangxi, occurs in the upper forest belt at about 1800 m, alongside *S. valentini* and *S. tephrocephalus* (author's unpublished observations, P. Holt pers. comm.).

Vocalisations (Fig. 10g): *S. affinis* is a 'triller' species. Due to its low and narrow frequency range the impression of song (in Sichuan and Jiangxi) is melodious and musical, thus different from all other trill singers. Up to 14 song types have been recorded in an individual male repertoire (from Omei Shan). Pure trills do occur but are rarer than closely packed trills and various note-groups in combination (Martens *et al.* 1999, Päckert *et al.* 2004). Calls are built from irregular whistled notes and form a kind of 'call verse', different from all other species of the *S. burkii* complex (Martens *et al.* 1999).

Sonagrams are figured in Martens & Eck (2000 [*Seicercus* sp., Omei Shan]), Martens *et al.* (1999 [*Seicercus* sp., Omei Shan], 2000 [*Seicercus* sp., Omei Shan], 2003 [Omei Shan], 2011 [Huanggang Shan]) and Päckert *et al.* (2004, Omei Shan).

Seicercus poliogenys (Blyth, 1847)

Included taxon (1): *S. poliogenys* (Blyth, 1847) [Darjeeling, NE India]. Monotypic.

Taxonomy: In the molecular genetic tree topology *S. poliogenys* is sister to *S. affinis* (Johansson *et al.* 2007, Olsson *et al.* 2004,). This is surprising because of the totally dark grey head of *S. poliogenys* and its little-developed lateral coronal stripes, giving an appearance quite different from all other members of the *S. burkii* complex. However, one *S. affinis* subspecies, *ocularis* from S Vietnam, is extensively grey coloured between the eye and lateral coronal stripe, including ear-coverts and neck (Rheindt 2006, with photo image).

Presently, the Grey-cheeked Warbler is considered monotypic. However, a molecular genetic analysis of specimens from West Bengal (NE India), Yunnan and S Vietnam demonstrated unexpectedly high cytochrome-*b* gene distance values: 6.9–7.3% between the Bengal population and the others; and 1.7% between Yunnan and S Vietnam (Olsson *et al.*

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2004)—the latter at population level but still remarkably high. A combined morphological, acoustic and more detailed genetic analysis may demonstrate that species-limits in *S. poliogenys* must be drawn anew.

General characteristics: A dark grey-headed *Seicercus* with little development of coronal stripes and a conspicuously irregular white eye-ring, broadest in the rear and broken above the eye (photo image in Rheindt 2006, plate 20). These distinctive characters allowed its early recognition as a species-level taxon but its unambiguous affinity with the *S. burkii* complex was revealed only by molecular genetic analysis (Olsson *et al.* 2004).

Distribution: Southeast Asian-Himalayan on present taxonomic understanding: the Himalayas and foothills east of Nepal, NW Burma and SW Yunnan south to N Thailand, Laos and Vietnam (Mayr *et al.* 1986, Cheng 1987), but Lekagul & Round (1991) give it only as a winter visitor to Thailand. As indicated, haplotype lineages are deeply split between the Himalayas (W Bengal) on the one side and Yunnan and S Vietnam on the other (Olsson *et al.* 2004). Evaluation of acoustic behaviour, morphological characterisation, etc., in contact zones remains a considerable challenge.

Vocalisations: Geographical variation little known. Territorial song of the Himalayan population follows the 'repetition of note-groups' (syllables) pattern: ABABAB or ABABCDCDCD, or the 'irregular group combined with a regular group' pattern: AABcdEFEFEF (Martens *et al.* 2011).

Sonagrams are figured in Martens *et al.* (2011 [Himalayan population]).

The *Seicercus castaniceps* complex

These tiny birds with reddish to chestnut-coloured cap, inconspicuous lateral coronal stripe and two broad wing-bars form a closely-knit group of, currently, three species. Mostly allopatric, collectively, these are distributed from the central Himalayas to S China and Southeast Asia as far as the Thai-Malay Peninsula, Sumatra, Borneo, Java and Bali (see below). Despite certain sympatric occurrences del Hoyo *et al.* (2006) united them as a superspecies, *Seicercus* [*castaniceps*]. In the molecular genetic tree topology they form one monophyletic group, with *S. castaniceps* and *S. grammiceps* as sister taxa opposed to *S. montis* (Olsson *et al.* 2004). The group is firmly nested in the *Phylloscopus* molecular genetic tree, but does not cluster with any of the *Seicercus* species of the *burkii* complex (Johansson *et al.* 2007, Olsson *et al.* 2004, Päckert *et al.* 2004,). Pairwise genetic distance values within the group are remarkably low. Those between *S. g. grammiceps* and *S. c. castaniceps* amount respectively to less than 1% (Olsson *et al.* 2004 [exact value not given]) and 1.5% (Päckert *et al.* 2004 [the origin of their *grammiceps* sample not recorded]). These are values more indicative of a subspecies than a species level of relationship, and vocalisations are also impressively similar. Territorial song in both taxa comprises a series of high-frequency whistles of which some notes exceed 8 kHz (Fig. 11a–c).

No genetic distance values between *S. montis* and the *castaniceps/grammiceps* pair are known to have been published (none presented by Olsson *et al.* 2004), but *montis* is said to produce songs of the same kind, with similar syntax patterns. Such similarities are in general accord with allopatry, although *castaniceps* ssp. and *montis* ssp. make contact parapatrically in Peninsular Malaysia, and locally in the Sumatran mountains all three species are said to meet. del Hoyo *et al.* (2006) imply *S. castaniceps* and *S. grammiceps* are of very restricted occurrence in the Sumatran range of *S. montis*, but the record from the field is *very* poor and S.C.Madge's sources for the distribution maps in this reference are not known to me. Independent understanding of the Sumatran situation is as follows: that although the literature up to van Marle & Voous (1988) implied much allopatric interdigitation of distributions, additional records since (see Holmes 1996) suggest that all three taxa are indeed in contact. In my estimation this contact is probably widespread. Records listed by van Marle & Voous (1988) suggest the Sumatran distributions of spp. *castaniceps* and *grammiceps* may be parapatric by altitude, and later reports are at least consistent with the idea

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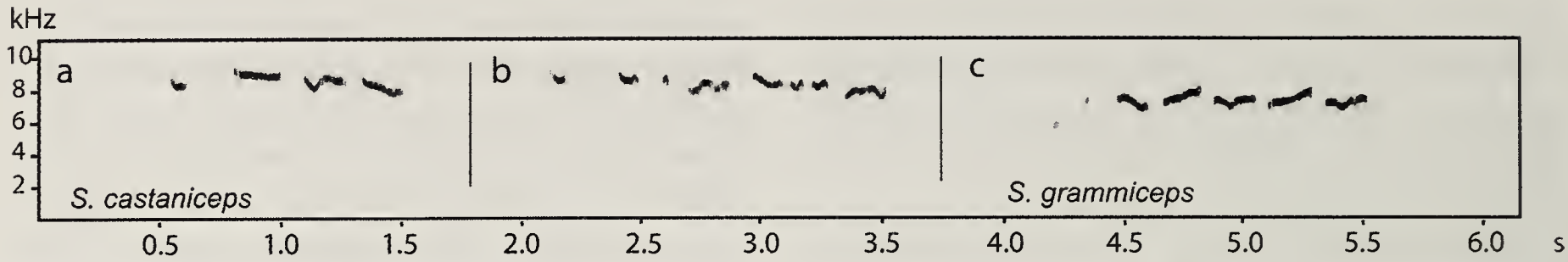

Figure 11. *Seicercus* territorial songs:
a, b) *S. castaniceps*: China, Sichuan;
c) *S. grammiceps*: Indonesia, Java.
(Recordings: (a, b) J. Martens, (c) J. Scharringa (sonogram drawn after Scharringa 1999)).

that these two taxa are stacked altitudinally. By contrast, *montis* seems to span the whole combined altitudinal range of the *castaniceps/ grammiceps* pair. Ecological relationships in Sumatra may, therefore, differ from those in neighbouring Peninsular Malaysia. Fieldwork to further investigate the pre-mating reproductive isolating mechanisms likely to be operating in areas of contact should focus on voice, habitat preferences and real extent of spatial partitioning, etc. Locally, even more complicated issues are in need of attention (see *S. castaniceps*, below).

Seicercus castaniceps

Included taxa (9): *S. c. castaniceps* (Hodgson, 1845) [Nepal]; *S. c. sinensis* (Rickett, 1898) [Kuatun (= Guadun), Fujian province, China]; *S. c. laurentei* (La Touche, 1922) [Mengtsz, SE Yunnan province , China]; *S. c. collinsi* Deignan, 1943 [Doi Langka (Khun Tan Range), NW Thailand]; *S. c. stresemanni* Delacour, 1932 [Phou Kong-Ntoul, Bolovens Plateau, S Laos]; *S. c. annamensis* (Robinson & Kloss, 1919) [Lang Bian Peaks and Dalat, S Vietnam]; *S. c. youngi* (Robinson, 1915) [Khao Nawng (= Khao Nong peak), Bandon (=Surat Thani province), S Thailand]; *S. c. butleri* (Hartert, 1898) [Gunong Hijau (= Hijau Peak), Larut Range, Perak, Malaya (= Peninsular Malaysia)]; *S. c. muelleri* (Robinson & Kloss, 1916) [Barong Bharu, Barisan Range, W Sumatra, Indonesia].

Taxonomy: Due to the discontinuity of its mountainous habitat over a large area, from the central Himalayas and S China to the Thai-Malay Peninsula and Sumatra, and poorly developed migratory behaviour, many localised, often strongly disjunct forms have developed. Resulting within-species variation, including of vocalisations and genetics, presents a new research challenge. Alongside ssp. *youngi* in the mountains of Surat Thani and Nakhon Si Thammarat, S Thailand, for instance, there exists a second localised form differing in various colour characteristics (Wells 2007). As these two 'morphs' are at least partially sorted by altitude, and as their differences are not convincingly age-related, the possibility of stable vertical packing and parallel vocal and genetic differences demands attention. A still unexplored but potentially similar situation holds in the range of ssp. *butleri* in Peninsular Malaysia (Wells 2007).

General characteristics: In the Thai part of the Thai-Malay Peninsula occurs in both Lower and Upper montane forests, to 1800 m, but on the Malayan Main Range is restricted to Lower montane forest only and unrecorded above 1380 m. This may be due to competition with the local form of *S. montis* which occupies higher altitudes (Wells 2007). Sumatran *S. c. muelleri* appears also to be restricted to Lower montane forest, not recorded above 1400 m altitude and believed to be replaced higher up by *S. grammiceps*.

Distribution: In subtropical to temperate montane forests from the central Himalayas to W and E Burma (Myanmar), S China eastwards at least to Fujian province (including the type locality of ssp. *sinensis*), continental Thailand and the Thai-Malay Peninsula, and in Sumatra where the endemic ssp. *muelleri* is known from only two specimens and just a few subsequent sight records (Holmes 1996, van Marle & Voous 1988).

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Vocalisations (Fig. 11a–b): See under *castaniceps* complex (above). Sonagrams of ssp. *sinensis* were published by Päckert *et al.* (2004).

***Seicercus grammiceps* (Strickland, 1849)**

Included taxa (2): *S. g. grammiceps* (Strickland, 1849) [originally no locality given, but generally referred to Java, Indonesia]; *S. g. sumatrensis* (Robinson & Kloss, 1916) [Sungei Kumbang, Korinchi (= Kerinci), W Sumatra, Indonesia].

Taxonomy: *S. grammiceps* is closely related to *S. castaniceps*, very similar in voice (for molecular and vocal data see above). Interactions where they meet (possibly parapatrically by altitude) on Sumatran mountains demand detailed study.

General characteristics: It may be speculated that the ecological relationship of *grammiceps* and *castaniceps* in Sumatra parallels that of the two *castaniceps* 'morphs' in S Thailand, i.e., sorting by altitude, a possibility leading to the question of whether there might be an isolated population of *grammiceps* on the continent. Note that in the absence of a congener in Java/Bali, nominate *grammiceps* is less restricted altitudinally than ssp. *sumatrensis*, occurring down to 800 m a.s.l. [= near to the lower limit of montane forest]. According to Robinson & Kloss (1918), '... Immature [Sumatran] birds have the colours much duller, the crown of the head being earthy brown, the yellow wing-bars are less distinct and the grey of the mantle and back less pure and often tinged with green. The large series [from Mt Kerinci] ... presents certain variations *inter se*, notably in the extent and strength of tint of the cinnamon wash on the throat, which in some specimens is very much stronger than those selected as types. Others have the flanks and under tail coverts slightly tinged with yellow.' As yet, this variation among presumed adults is unexplained.

Distribution: Restricted to Sumatra, Java and Bali (see del Hoyo *et al.* 2006). In Sumatra, ssp. *sumatrensis* confirmed from mature montane forest, including oak-laurel stands, between 1400 and 2200 m of only three mountain tops, all in Barat (W Sumatra) province: Tujuh, Talamau and Kerinci (Holmes 1996, van Marle & Voous 1988).

Vocalisations (Fig. 11c): See above. A sonagram after a tape recording published by Sharringa (1999) was published by Päckert *et al.* (2004) and is reprinted here.

***Seicercus montis* (Sharpe, 1887)**

Included taxa (6): *S. m. montis* (Sharpe, 1887) [Mt. Kinabalu, Sabah, NW Borneo]; *S. m. davisoni* (Sharpe, 1888) [Gunong Ulu Batang Padang, (vicinity of Batu Putih peak, Main Range, *fide* Wells 2007), Perak, Malaya (= Peninsular Malaysia)]; *S. m. inornatus* (Robinson & Kloss, 1920) [Badae baroe (=Bandarbaru), Deli, NE Sumatra, Indonesia]; *S. m. xanthopygius* (Whitehead, 1893) [Palawan, Philippines]; *S. m. floris* (Hartert, 1897) [S Flores Island, Indonesia]; *S. m. paulinae* (Mayr, 1944) [Mt. Mutis, Timor Island, Indonesia].

Taxonomy: *S. montis* is closely related to the sister pair *S. castaniceps* and *S. grammiceps* (Olsson *et al.* 2004) but largely allopatric to these (see above). Due to its insular and additional 'mountain-island' distribution quite heavily diversified into distinct subspecies (see above).

General characteristics: In Peninsular Malaysia limited to Upper montane forest, common above 1500 m elevation and recorded to 2030 m on the Main Range, 2070 m on isolated Mt Benom (Pahang state). In this part of the Thai-Malay Peninsula there is mutual vertical exclusion between *S. montis* and *S. castaniceps* (Medway & Wells 1976, Wells 2007). In Sumatra occurs over a greater elevational range, 2200 m down to 1000 (thus in Lower as well as Upper montane forest: see van Marle & Voous 1988), and only in Sumatra is there evidence that it is actually syntopic with other species of *Seicercus* of the *castaniceps* complex.

Distribution: Except for the Thai-Malay Peninsula, restricted to island SE Asia—Sumatra, Borneo, Palawan, Flores and Timor.

Vocalisations: The territorial song is said to be similar to that of *S. grammiceps* and *S. castaniceps* (Päckert *et al.* 2004); but no details available, and no sonagrams published.

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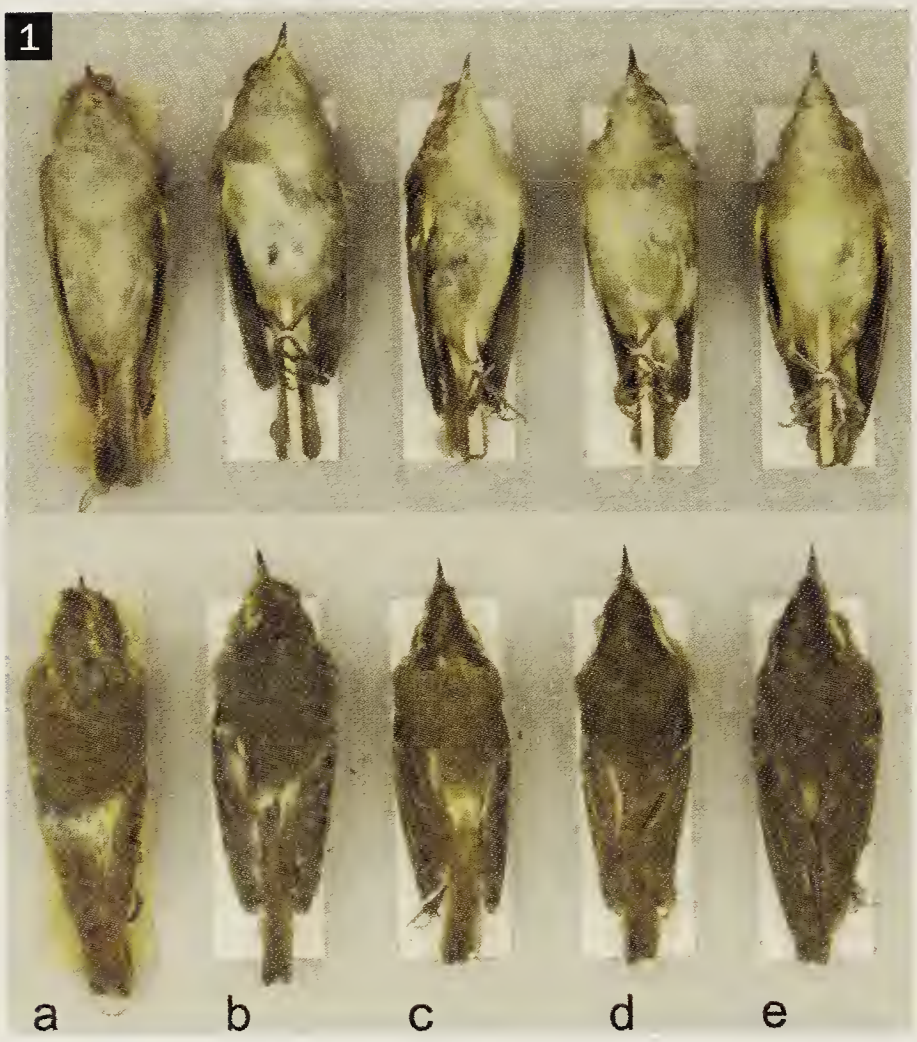

Plate 1. *Phylloscopus* species underparts (upper row) and upperparts (lower row).
P. forresti
a) China, Sichuan, Kwanshien (=Dujiangyan, 20.4.1914 (MTD)
b) China, Shaanxi, Taibai Shan, 5.5.2005 (MAR 4908)
P. yunnanensis
c) China, Shaanxi, Taibai Shan, 5.5.2005 (MAR 4909)
d) China, Shaanxi, Taibai Shan 4.5.2005 (MAR 4905)
P. kansuensis
e) China, Gansu, Lianhua Shan, 31.5.2005 (MAR 4972)
[Photographs: B. Bastian]

Plate 2. *Phylloscopus reguloides* underparts (upper row) and upperparts (lower row).
P. reguloides reguloides
a) Nepal, Myagdi Distr., Muri, 25.3.1970 (MAR 4808)
b) Nepal, Myagdi Distr., Dhorpatan (MAR 4804).
P. reguloides ticehursti
c, d) China, Yunnan, Jizu Shan, 27./28.4.2002 (MAR 3233, MAR 3214)
[Photographs: B. Bastian]

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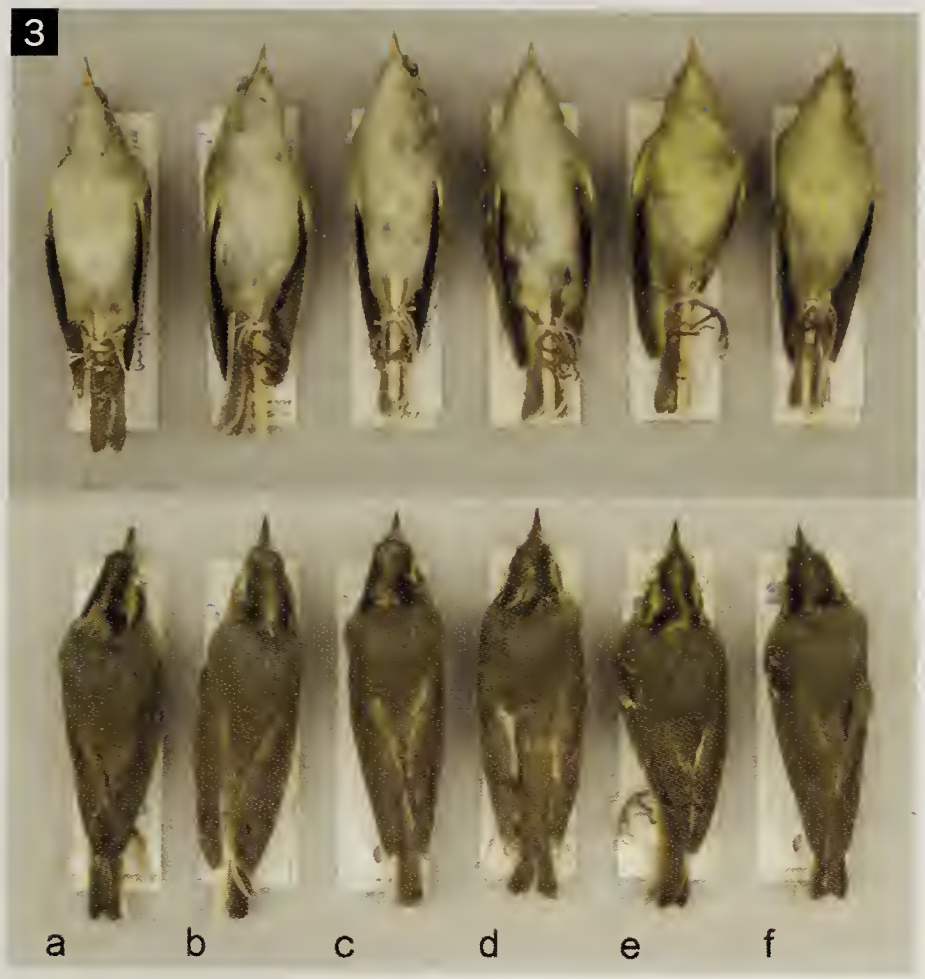

Plate 3. *Phylloscopus* underparts (upper row) and upperparts (lower row)

Phylloscopus claudiae

a) China, Sichuan, Wawu Shan 10.5.2002 (MAR 3259),

b) China, Sichuan, Pingwu, 18.5.2005 (MAR 4943).

Phylloscopus cf. *goodsoni*

c, d) China, Shaanxi, Foping Panda Reservation, 10.5.2005 (MAR 4924, MAR 4927).

Phylloscopus goodsoni

e, f) China, Jiangxi, Huanggang Shan, 12.5.2006, 8.5.2006 (MAR 5729, MAR 5710).

[Photographs: B. Bastian]

Plate 4. *Phylloscopus* underparts (upper row) and upperparts (lower row).

P. xanthoschistos ssp.

a) India, Punjab, 2.1.1914 (MTD C 30041).

P. davisoni

b) Thailand, Chiang Mai, Doi Inthanon, 29.2.1998 (MAR 853)

c) Thailand, Chiang Mai, Doi Suthep, 12.3.1998 (MAR 867)

d) China, Yunnan, Jizu Shan, 29.4.2002 (MAR 3240)

P. hainanus

e, f) China, Hainan Island, Diao Luo Shan, 2.5.2006 (MAR 5701, MAR 5702).

[Photographs: B. Bastian]

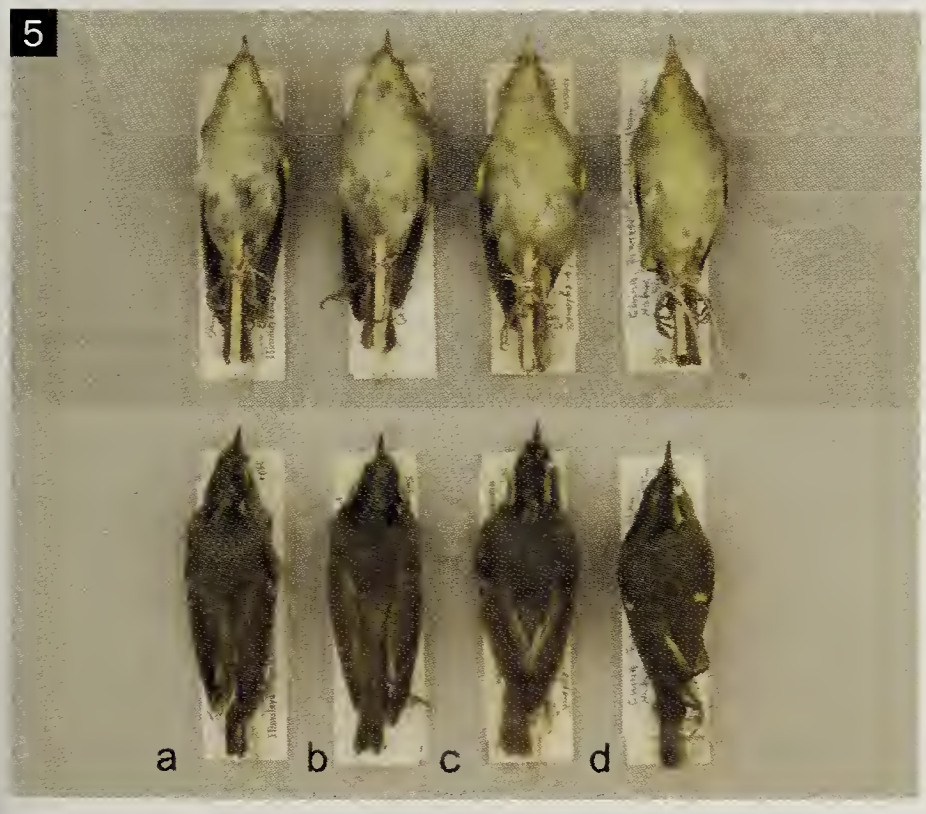

Plate 5. *Phylloscopus ogilviegranti* underparts (upper row) and upperparts (lower row).

P. ogilviegranti disturbans

a) China, Shaanxi, Foping Panda Reservation, 10.5.2005 (MAR 4925)

b) China, Sichuan, Tangjiahe, 18.5.2005 (MAR 4942)

P. ogilviegranti ogilviegranti

c) China, Guizhou, Kuankuoshui, 9.7.2006 (MAR 5834)

d) China, Jiangxi, Huanggang Shan, 12.5.2006 (MAR 5730).

[Photographs: B. Bastian]

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Plate 6. *Seicercus* underparts (upper row) and upperparts (lower row).

S. burkii sensu stricto

a, b) Nepal, Bhojpur Distr., above Phedi, 2100 m, both 15.4.2001 (MAR 2731, MAR 2730).

S. whistleri whistleri

c, d) Nepal, Bhojpur Distr., above Phedi, 5.4.2001 (2100 m); 15.4.2001 (2280 m) (MAR 2652, MAR 2728).

S. valentini latouchei

e) China, Jiangxi, Wuyi Shan, 13.5.2006 (MAR 5733),

S. valentini valentini

f) China, Sichuan, Wawu Shan, 12.5.2002 (MAR 3268).

[Photographs: B. Bastian]

Plate 7. *Seicercus* underparts (upper row) and upperparts (lower row).

S. tephrocephalus

a) China, Hubei, Shennongjia Biodiversity Research Station, 1.6.2008 (MAR 7011),

b) Myanmar, Natmataung National Park, 30.3.2005 (MAR 4728).

S. soror

c) China, Sichuan, Longxi-Honkou Reservation, 18.5.2002 (MAR 3288),

d) China, Sichuan, Omei Shan, Wannian, 29.5.1998 (MAR 904).

S. omeiensis

e) Myanmar, Mt. Victoria, Natmataung National Park, 31.3.2005 (MAR 4741),

f) China, Sichuan, Gongga Shan above Moxi, 25.5.2008 (MAR 6990).

[Photographs: B. Bastian]

Plate 8. *Seicercus affinis* underparts (upper row) and upperparts (lower row).

S. affinis ssp.

a, b) China, Sichuan, Omei Shan, Hongchun, 20.5.2000 (MAR 2047, MAR 2042),

S. affinis affinis

c) China, Fujian, 25.8.1905 (MTD C 26162);

d) China, Jiangxi, Huanggang Shan, 13.5.2006 (MAR 5735).

[Photographs: B. Bastian]

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SYSTEMATIC NOTES ON ASIAN BIRDS: 73.

On the validity of *Sitta villosa corea* Ogilvie-Grant, 1906, from the Korean Peninsula, SW Ussuriland and NE China

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ABSTRACT Sixty specimens of the Chinese Nuthatch *Sitta villosa* from seven different collections revealed a well-defined divergence in body coloration between isolated populations of N China (*villosa sensu stricto*) and northern Korea to SW Ussuriland (the so-called 'corea' form). The 'corea' population is paler at all seasons. On that basis, even though the difference in wing-length between populations reported by other authors was not found to be significant, we recommend recognition of *Sitta villosa corea* Ogilvie-Grant 1906 as a valid subspecies.

KEY WORDS China, Chinese Nuthatch, coloration, geographical isolation, Korean Peninsula, *Sitta villosa corea*, Ussuriland.

INTRODUCTION

The Chinese Nuthatch *Sitta villosa* currently inhabits a transitional belt between the forest biota of East Asia and the steppe and desert biota of Inner Asia (Fig. 1; cf. Nazarenko 2006: 266). This terrain is characterized ecologically by its diverse topography, huge climate range and two millennia of human impact. Typically, it features mountain 'islands' of woodland and patches of conifer trees (Meng Lihua *et al.* 2007, Ren & Beug 2002, Wang Chiwu 1961). Rather than inhabiting the interior of closed-canopy, lowland forest tracts, Chinese Nuthatch selects just these upland 'islands', preferring loose stands of conifers and, exceptionally, larger parks (Fiebig 1992, Nazarenko 2006). As an outcome, the whole species' range is broken into numerous localized pockets of population (Fig. 1). For an assessment of geographical variation, especially for checking whether clines of variation occur (cf. Harrap 1996: 142), specimens from representative Korean, Ussuriland and Chinese populations were all included in the data set.

The validity of Ogilvie-Grant's (1906: 87) proposed form *corea* as a distinguishable subspecies of *Sitta villosa* was contested by Vaurie (1959: 529), and recent taxonomy treats this name mostly in the synonymy of nominate *villosa* Verreaux, 1865 (cf. Dickinson 2003: 646, Fiebig 1992: 152, Greenway 1967: 137, Harrap 1996: 142, Li Guiyuan *et al.* 1982: 70–74). Vaurie (1959) considered the morphological differences between nominate *villosa*, type locality given as 'China north of Peking', and *corea*, type locality 'Mingyong, 110 miles south-east of Seoul' (Vaurie 1959 and Nazarenko 2006 link this with today's Mungchong-dong, South Korea, at 36°08'N: 127°45'E), as too minor to warrant subspecific recognition. However, Simon Harrap (Harrap 2008: 135) has since revived the name *corea* for the population of the Russian Far East, NE China and extreme northern Korea, although rarity of museum skin material from NE China and the Korean Peninsula has been a major problem for assessment of the species group (Nazarenko 2006). Here, we include new material from collections previously not considered, and present the largest data set so far analyzed.

We commenced this study some years ago while investigating the recent expansion of breeding *Sitta villosa* into SW Ussuriland, and the question as to which population

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these birds might belong. Some comparative material was collected locally (Nazarenko 1988, 2005), but to solve the question of subspecies identity in Ussuriland it became essential to include in the data analysis specimens from central northern China on one hand, and of NE China and northern Korea on the other. These two populations are considered geographically disjunct (Lei Fumin & Lu Taichun 2006, Nazarenko 2006), see Fig. 1, and this paper investigates whether they differ morphologically to a degree sufficient to support subspecific treatment. Nazarenko (2006) estimated the range gap between populations to be about 300 km of probably originally mainly treeless lowlands (cf. data in Lei Fumin & Lu Taichun 2006).

METHODOLOGY

Because Vaurie (1959) and Harrap (1996) pointed out that the major differences between nominate *villosa* and *'corea'* are body coloration (*'corea'* being paler) and size (*'corea'* smaller), we focused on these characters. Preliminary studies showed that the coloration of lower parts (i.e., breast, flanks, belly and vent) suffers considerable seasonal change, being lighter and more colourless during the breeding season (April–July) due to feather wear, and comparatively duller during the winter season (August–December). This made it necessary to study breeding and post-breeding season specimens separately.

We took digital photographs (together with a Kodak standard colour chart for comparison) and, because the images were taken by different people and different cameras under different light conditions, applied a colour correction programme used at the publishing house 'Apelsin' of Vladivostok. Also, in non-moulting individuals, both right and left wing-lengths (carpal joint to longest flight-feather, straightened) were measured by a total of four different persons; personal measurement bias effects subsequently minimized using STATISTICA software. When the length of

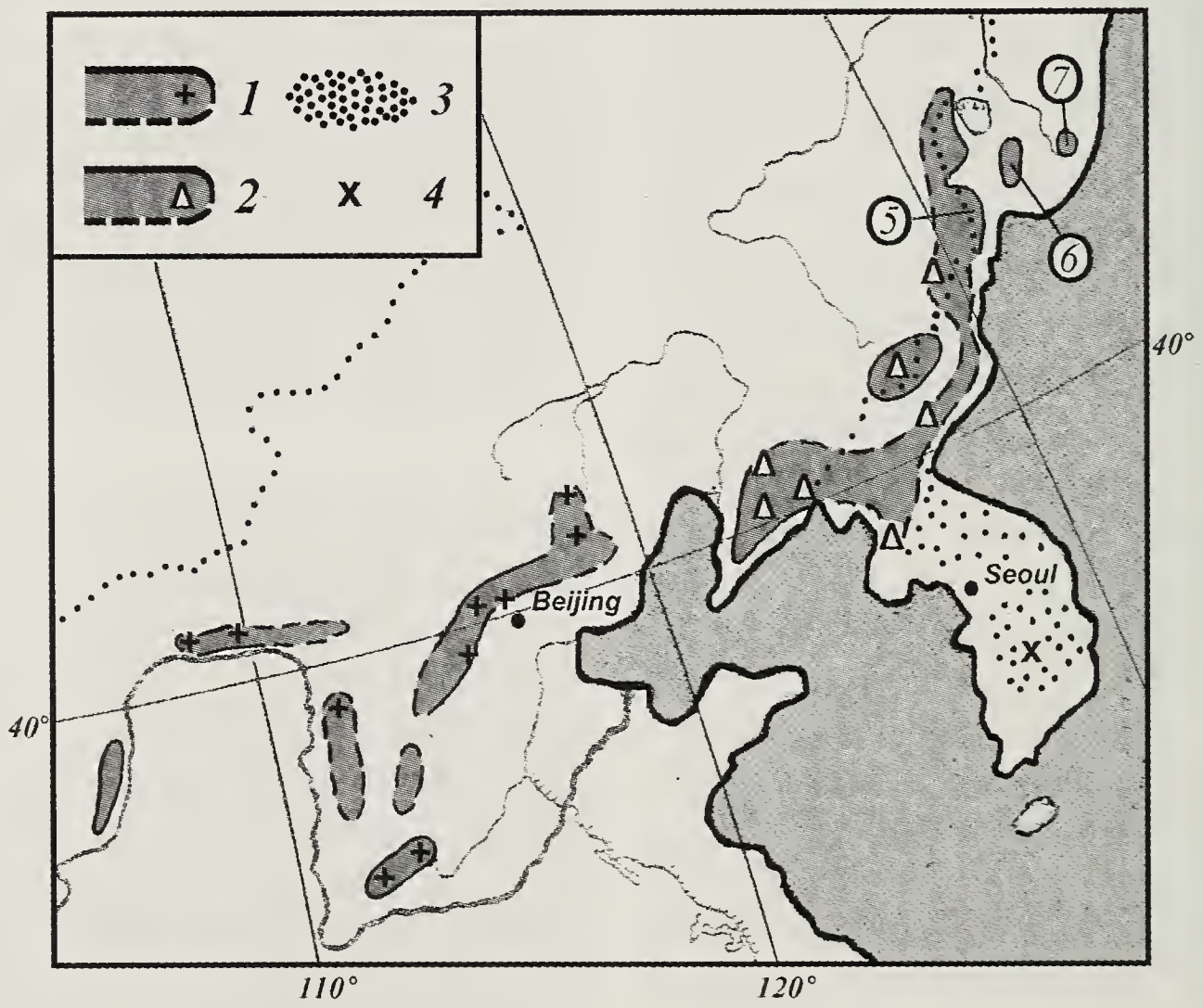

Figure 1. Map of the known breeding range of the Chinese Nuthatch *Sitta villosa* (from: Lei Fumin & Lu Taichun 2006; Nazarenko 1988, 2005, 2006; Tomek 2002, with refinements, see text). Key to numbers: 1. Range of *S.v. villosa*. 2. Range of *S.v. corea*. 3. Known wintering grounds of *corea* outside of its breeding range. 4. Probable type locality of *corea* (see text). Isolated localities in Russia: 5. Shufan. 6. Lefu. 7. Muta (see Appendix).

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the right wing differed from the left the mean measurement of the two was used. Obtained means differed somewhat from values given in the literature, and this we comment on in the conclusion.

Altogether, 60 specimens from seven different collections were studied (see: Acronyms and Appendix).

RESULTS

Body coloration

Nominate *villosa* and *'corea'* differ only in the colours of the lower parts: breast, belly, and flanks to vent. The *corea* population in breeding condition shows these as uniform dull Pale Neutral Grey (Smithe 1975, colour 86) with a wash of Drab-Grey (colour 119D), and females show more of a sandy tinge than males. The dull-whitish colour of the chin and throat is not sharply demarcated from the colour of the breast (Plate 9, images 1–10). In post-breeding plumage the underpart colour approaches darkish Saffron (colour between 123A and 38) and pale greyish Cinnamon (colour 39), becoming more darkish sandy and Tawny Olive (colour 223D) towards the flanks and belly. Whitish chin, cheeks and throat contrast rather well with the darker breast and belly (Plate 9, images 19, 21; Plate 11, image 18).

By contrast, birds of the *villosa* population are in all seasons darker on the underparts. The whitish throat patch is more restricted and has a Tawny Olive tinge (colour 223D). Plate 10 (images 14–17 *corea* and 23–27 nominate *villosa*) compares the plumage in breeding condition. Towards the sides of the breast, flanks and belly the colour of nominate *villosa* grades to Greyish-Olive (colours 43–45) (see Plate 10, images 28–31 and Appendix). In post-breeding plumage, all colours are more saturated, and some specimens of nominate *villosa* then show no white on the throat (Plate 11, images 18 *corea*, 42–44 nominate *villosa*). A third named form, *bangsi* Stresemann, 1929, from north-central China, is the darkest population, in which the non-breeding plumage belly and vent are Raw Umber (colour 123; based on the type specimen ZMB 27.519 and 12 additional specimens).

Wing-length

No statistically significant difference in wing length was found between the populations within the range N China and northern Korea to SW Ussuriland (see Appendix).

Male *S. v. villosa*: n = 16, mean = 64.994 ± 1.9 (61.5–68.1) mm, C_v = 2.9.

Male *'corea'*: n = 24, mean = 64.775 ± 1.8 (60.8–68,9) mm, C_v = 2.8.

Student's criterion: t = -0,37, P = 0.72.

Female *S. v. villosa*: n = 13, mean = 63.477 ± 0,9 (62.0–65.0) mm, C_v = 1.4.

Female *'corea'*: n = 6, mean = 63.783 ± 1.5 (62.0–65.0) mm, C_v = 2.4.

Because of the small size of the *corea* sample, and Cv divergence, no t-test was applied to females.

The absence of biometric differences in wing and also tail lengths had already been noted by Fiebig (1992), in a series of 28 specimens from central-north China and northern Korea.

CONCLUSION

Taxonomic assessment of the *'corea'* population

Comparison of specimens from N China with those from northern Korea and SW Ussuriland has shown a constant divergence in coloration of the underpart plumage, season for season, and despite practically no difference in body size, as measured by wing length, we regard this as sufficient to confirm the existence of a subspecies *S.v. corea*.

The holotype of *corea* (BMNH 1907.12.290, see Plate 12, image 22), an adult post-breeding male, was collected by Malcolm P. Anderson on 30 November 1905 '110 miles south-east of Seoul, Korea' (Warren & Harrison 1971: 131). Information on Anderson's movements in the south and south-eastern territories of the Korean Peninsula during 1905 is extremely scarce (Austin 1948: 11), and we find a discrepancy in the literature concerning the type locality of *corea*. The type derives either from territory adjacent to north Chungchong

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Plate 9. Underpart coloration of specimens from Ussuriland at different seasons. Nos.1–10 breeding plumage (10 is female), Nos. 19 and 21 late August adults in fresh post-breeding plumage, No. 60 a fully grown young male of late June (see text and Appendix).
(Photograph: S. Surmach).

Plate 10. Underpart coloration of specimens in breeding season from northern Korea: Nos. 14–17, in comparison to specimens of nominate *villosa* from Beijing, N China, Nos. 23–27 (see text and Appendix).
(Photograph: F. Steinheimer).

(Austin 1948: 197; = Mungchong) or from north Kyongsang province (Ogilvie-Grant 1906). The name Mingyong (Ogilvie-Grant 1906; Vaurie, 1959: 529) could neither be traced in the current world gazetteers nor from any internet source, whereas the settlement Mungchong (see Austin 1948) exists: it is the Mungchong-dong district of Yongju City, 36°50′N, 128°37′E, 170 km (105.6 miles) south-east of Seoul (information from Dr Victor Ryashentsev, specialist in Korean Studies). Thus, we follow Austin (1948) and herewith formally restrict the type locality of *corea* to modern Mungchong-dong, Yongju City, North Kyongsang Province, South Korea. The

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Plate 11. Underpart coloration of specimens in post-breeding plumage from Ussuriland, no. 18, late August, in comparison to birds from North China, nos. 42–44 (see text and Appendix).
[Photograph: S. Surmach].

Plate 12. Holotype of *corea*, No. 22 dated 30 November 1905, compared with male No. 41 dated 28 December 1907 from Shanxi, N China (see text and Appendix).
[Photograph: K. van Grouw].

area is known for wintering birds of the *corea* population (e.g., Austin 1948: 197; Tomek 2002: 120–121). The holotype is atypically small, with a wing-length of only 62.0 mm (measurements taken by Katrina van Grouw, BMNH), against a population mean of 64.8 mm (see above). We see therein the reason why for a long time the Korean population was believed to be smaller than the nominate population, and the data of Stresemann *et al.* (1937: 512) showing an average of 66.2 (63–69) mm (n = 10) for nominate *villosa* probably supported this opinion even further. Tomek (2002: 121) listed the wing-length of Korean birds considerably larger: 66.0 (63–68) mm (n = 8) for males, and 64.4 (63–67) mm (n = 8) for females. Zheng Baolai (1982: 71), on the other hand, gave similar figures for nominate *villosa*: 64.7 (62.5–67.5) mm for males (n = 9) and (62.5–64.5) mm for females (n = 5).

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ACRONYMS

BMNH	The Natural History Museum, Tring.
FESU	Zoological Museum at Far East State University, Vladivostok.
IZAS	Institute of Zoology, Chinese Academy of Sciences, Beijing.
SMTD	Staatliches Museum für Tierkunde, Dresden.
WCNS	Working Collection of A. Nazarenko and S. Surmach, Vladivostok.
YIO	Yamashina Institute for Ornithology, Abiko City.
ZMB	Museum für Naturkunde an der Humboldt-Universität zu Berlin.

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APPENDIX

List of specimens used in this study

No.	Subspecies	Sex	Wing-length (mm)	Collection Date	Locality	Museum Acronym & Reg. No.	Collector
1	*corea*	M	68.9	17.05.1970	Muta	WCNS № 1	A.A. Nazarenko
2	*corea*	M	63.9	27.06.1970	Muta	WCNS № 2	A.A. Nazarenko
3	*corea*	M	63.5	29.06.1971	Shufan	WCNS № 3	A.A. Nazarenko
4	*corea*	M	62.8	09.06.1968	Muta	WCNS № 4	A.A. Nazarenko
5	*corea*	M	65.5	30.06.1971	Shufan	WCNS № 5	A.A. Nazarenko
6	*corea*	M	66.5	30.06.1970	Muta	WCNS № 6	A.A. Nazarenko
7	*corea*	M	65.3	16.06.2007	Lefu	WCNS № 7	A.A. Nazarenko
8	*corea*	M	65.4	19.06.2007	Lefu	WCNS № 8	A.A. Nazarenko
9	*corea*	M	64.3	18.06.2007	Lefu	WCNS № 9	A.A. Nazarenko
10	*corea*	F	64.2	25.06.1970	Muta	WCNS № 10	A.A. Nazarenko
11	*corea*	F	63.3	09.06.1968	Muta	WCNS № 11	A.A. Nazarenko
12	*corea*	F	62.4	18.06.2007	Lefu	WCNS № 12	A.A. Nazarenko

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13	*corea*	M	64.6	08.05.1965	L. Pelis	FESU (II 2737/3256)	Yu.N. Nazarov
14	*corea*	M	66.9	30.05.1990	Pyongyang	ZMB 1990.127	J. Fiebig
15	*corea*	M	64.6	30.05.1990	Pyongyang	ZMB 1990.128	J. Fiebig
16	*corea*	M	65.9	02.05.1989	North of Pyongyang	ZMB 1990.126	J. Fiebig
17	*corea*	M	65.8	02.05.1989	North of Pyongyang	ZMB 1990.125	J. Fiebig
18	*corea*	M	66.5	25.08.2007	Lefu	IZAS	V.N. Sotnikov
19	*corea*	F	65.3	25.08.2007	Lefu	WCNS №19	V.N. Sotnikov
20	*corea*	M	64.5	25.08.2007	Lefu	WCNS №20	V.N. Sotnikov
21	*corea*	M	64.5	25.08.2007	Lefu	WCNS №21	V.N. Sotnikov
22	*corea* (holotype)	M	62.0	30.11.1905	Min-Gyong, 110 miles SE of Seoul	BMNH 1907.12.290	M.P. Anderson
23	*villosa*	M	67.9	11.03.1916	Peking (Hsiling)	ZMB 24.209	H. Weigold
24	*villosa*	F	65.0	11.03.1916	Peking (Hsiling)	ZMB 24.210	H. Weigold
25	*villosa*	F	62.8	10.03.1916	Peking (Hsiling)	ZMB 25.148	H. Weigold
26	*villosa*	F	64.0	10.03.1916	Peking (Hsiling)	ZMB 25.149	H. Weigold
27	*villosa*	M	–	29.04.1916	Jehol NE of Peking	ZMB 25.147	H. Weigold
28	*villosa*	F	64.7	30.04.1916	Jehol NE of Peking	SMTD C.23926	H. Weigold
29	*villosa*	M	68.1	10.03.1916	Peking (Hsiling)	SMTD C.32052	H. Weigold
30	*villosa*	M	63.9	25.02.1916	Peking	SMTD C.23924	H. Weigold
31	*villosa*	F	63.4	12.03.1916	Peking (Hsiling)	SMTD C.23925	H. Weigold
32	*villosa*	M	65.0	10.03.1916	Peking (Hsiling)	BMNH 1965-M-15757	R. Meinertzhagen
33	*villosa*	F	63.0	06.04.1902	Peking, Ming Tombs	BMNH 1914.815.371	F.W. Styan (p)
34	*villosa*	M	65.0	06.04.1902	Peking, Ming Tombs	BMNH 1914.815.372	F.W. Styan (p)
35	*villosa*	F	64.0	??.08.1968	Peking	BMNH 1881.5.1.4376	J. Gould
36	*villosa*	F	63.0	18.09.1868	Peking, Ming Tombs	BMNH 1898.9.20.967	R. Swinhoe
37	*villosa*	F	62.0	18.09.1868	Peking, Ming Tombs	BMNH 1898.9.20.968	R. Swinhoe
38	*villosa*	F	62.0	14.10.1867	Moupin	BMNH 1898.9.20.969	Pere David, ex R. Swinhoe coll
39	*villosa*	M	63.0	28.12.1907	Shan-Si (= Shanxi)	BMNH 1907.12.17.205	M.P. Anderson
40	*villosa*	M	67.0	28.12.1907	Shan-Si (= Shanxi)	BMNH 1907.12.17.206	M.P. Anderson
41	*villosa*	M	65.0	28.12.1907	Shan-Si (= Shanxi)	BMNH 1907.12.17.207	M.P. Anderson
42	*villosa*	M	63.6	12.09.1953	Hebei	IZAS 15016	not given
43	*villosa*	F	64.3	17.08.1917	NE Chihli	IZAS 23601	A. de C. Sowerby
44	*villosa*	M	65.3	04.08.1917	NE Chihli	IZAS 23599	A. de C. Sowerby
45	*villosa*	M	62.5	02.03.1956	Hebei	IZAS 45638	not given
46	*villosa*	M	64.4	03.04.1955	Hebei	IZAS 19105	not given
47	*villosa*	M	66.3	27.05.1962	Shan-Si (= Shanxi)	IZAS 43607	not given
48	*villosa*	M	64.4	24.05.1962	Shan-Si (= Shanxi)	IZAS 43608	not given
49	*villosa*	F	63.6	20.11.1916	Peking	IZAS 23600	Ch. Gayot (?)
50	*villosa*	F	63.4	20.11.1916	Peking	IZAS 23598	Ch. Gayot (?)
51	*villosa*	M	61.5	30.12.1955	Hebei	IZAS 45637	not given
52	*villosa*	M	67.0	19.10.1935	Alto Rian, Jehol	YIO 33968	H. Orii

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53	*corea*	M	65.4	29.08.1929	Non Sayon, Korea	YIO 39967	H. Orii
54	*corea*	M	63.0	07.12.1917	North Korea	YIO 39969	not given
55	*corea*	M	60.8	??.08.????	North Korea	YIO 39970	H. Orii
56	*corea*	F	62.0	30.07.????	North Korea	YIO 39964	H. Orii
57	*corea*	M	66.0	07.08.????	North Korea	YIO 39965	H. Orii
58	*corea*	F	65.5	08.08.????	North Korea	YIO 39966	H. Orii
59	*corea*	M	62.0	30.08.2007	Lefu	WCNS № 22	S.G. Surmach
60	*corea*	M	66.0	30.06.1970	Muta	WCNS № 21a	A.A. Nazarenko

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SYSTEMATIC NOTES ON ASIAN BIRDS: 74

A preliminary review of the grebes, family Podicipedidae

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ABSTRACT Six grebe species are recognized to occur regularly in relevant territory, including breeding populations of five; one as a non-breeding migrant only, to far-northern areas. On morphological grounds, *Tachybaptus tricolor* is accepted as split from *T. ruficollis* at species level, and the *ruficollis* populations of S Asia are assigned to a subspecies (*albescens*) separate from those of the Afrotropics.

KEY WORDS grebe, Podicipedidae, *Podiceps*, *Tachybaptus*, subspecies, taxonomy.

INTRODUCTION

Following the format of the series (see Dekker *et al.* 2000, Dickinson & Decker 2000), this paper summarizes recent developments in the systematics of the grebes, family Podicipedidae, taking Storer's (1979) treatment of the family in Peters' *Check-list of Birds of the World* as a starting-point. The geographical area covered (hereafter referred to as 'SNAB territory') is as defined by Dickinson & Dekker (2000; and see map in the Foreword of the current issue).

Since Storer (1979), grebes have been monographed by Llimona & del Hoyo (1992), O'Donnel & Fjeldså (1997), Ogilvie (2001), and Fjeldså (2004) who presented a cladistic tree for the family. Bocheński (1994) studied comparative osteology (see also Storer 1996), Fjeldså (1973, 1982, 1983, 2004) studied microevolutionary processes, especially shifts in bill size and shape in selected Old World taxa, and Mees (2006) revised some forms of *Tachybaptus novaehollandiae*. The present paper reviews this literature, and draws on my own studies of museum specimens (BMNH, NMP, ZMB, ZMUC) to address grebe systematics as they apply in Asia.

The family has a worldwide distribution. Overall, 19 (Storer 1979) or 22 species (Dickinson 2003, Fjeldså 2004) are distinguished; and six of the latter total occur regularly in SNAB territory.

TAXONOMY AT GENUS LEVEL

Because they form an isolated group within modern birds, and their fossil record in the northern hemisphere goes back only to the early Miocene (Mlíkovský 1999, 2002, Švec 1982), grebes are presumed to have originated in the southern hemisphere (Olson 1985). All known taxa (fossil and modern) have similar body proportions and similar bill shapes, indicating that no major adaptive radiation and, hence, probably no supraspecific evolution (cf. Mlíkovský 1987) took place within this group after the Palaeogene (Mlíkovský 1999, 2002, Olson 1985, 1995). The absence of marked osteological differences among and between fossil and modern grebe species (Bocheński 1994, Mlíkovský 2002, Olson 1995) supports this conclusion.

These strictly morphological data indicate that all Neogene and modern grebes form a group of closely interrelated taxa and that they should be included in a single genus. In spite of this, most authors (e.g., Bocheński 1994, Dickinson 2003, Fjeldså 2004, Llimona & del Hoyo 1992, Peters 1931, Storer 1979) have recognized several genera of modern grebes, based variously on behavioural characters (e.g., Storer 1963), plumage patterns of downy young (Storer 1967), and certain individually variable osteological characters (Bocheński 1994, Storer 2000).

Although I prefer to include all Neogene and modern grebes in a single genus *Podiceps* Latham, 1787, this argument lies beyond the scope of a paper on Asian grebe taxonomy because most of currently recognized genera occur only outside of SNAB territory. Here then I follow Storer's (1979) and Fjeldså's

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(2004) arrangements, and recognize two genera of Asian grebes: *Podiceps* Latham, 1787, and *Tachybaptus* Reichenbach, 1852 (see also Mlíkovský 2010b, this issue).

At species level (and between sexes within species), the evolution of ecologically significant differences has involved mainly body size (Fjeldså 2004, Llimona & del Hoyo 1992) and size and shape of the bill (Fjeldså 1973, 1982, 1983, 2004). Flightlessness evolved in several lineages (Livezey 1989), but is not known to have done so within SNAB territory.

TAXONOMY AT AND BELOW SPECIES LEVEL

Tachybaptus novaehollandiae (Stephens, 1826)

The Australasian (Little) Grebe is mainly a species of Australia and New Guinea (Fjeldså 2004, Llimosa & del Hoyo 1992), reaching SNAB territory only in the Lesser Sundas, on Java, and in the Talaud Islands north of Sulawesi. Mayr (1943), who retained the Australasian Grebe in *Podiceps*, applied minor plumage characters to separate birds from Java as *P. n. javanicus*, those from Timor as *P. n. timorensis*, and the Talaud Islands population as *P n. fumosus*. Mees (2006) concluded that Lesser and Greater Sunda Islands birds are inseparable from the subspecies inhabiting mainland Australia (see also van Oort 1910), and consequently synonymized *timorensis* and *javanicus* with the nominotypical *novaehollandiae* of Stephens (1826). The taxonomic status of *fumosus* from Kaburuang and Sangihe in the Talaud group has never been re-checked, but as this population is fairly remotely isolated from the rest of the species' range I provisionally recognize *fumosus* as a valid subspecies of *T. novaehollandiae*.

Tachybaptus tricolor (Gray, 1861)

The dark-bellied, long-billed Little Grebes inhabiting Wallacea, New Guinea and adjacent islands were recognized as separate from *T. ruficollis* by several early authors (e.g., Brüggeman 1876, Meyer & Wiglesworth 1898, Ogilvie-Grant 1898), who correctly pointed out their distinguishing characters. However, Schlegel (1867) had united *tricolor* with *P. minor* (= *T. ruficollis*), and Peters (1931) and others (e.g., Dickinson 2003, Fjeldså 2004, Llimona & del Hoyo 1992, Storer 1979) followed him. I examined Little Grebes of the *tricolor*-type from the islands of Sulawesi, Buru, Ternate, Lombok, Flores and Timor, and those of the allopatric *ruficollis*-type from the Philippines (Luzon) and mainland Asia, Europe and Africa (BMNH, NMP, ZMB). The *tricolor*-type birds consistently differed from neighbouring Asian (and also European and African) *ruficollis*-type birds in having dark underparts and (*contra* White & Bruce 1986) longer and more massive bills (see also Fjeldså 1983, 2004 for bill dimensions in these grebes). In addition, I found sexual size dimorphism in bill length to be more pronounced in *tricolor*-type than in *ruficollis*-type birds. In the latter character, *tricolor*-type birds are similar to *T. novaehollandiae*, with which they are sympatric in parts of their range. Based on these characters I, therefore, propose that *T. tricolor* be recognised as a species distinct from *T. ruficollis*.

I found little variation in size, general coloration and bill length and shape within *T. tricolor*. However, there seems to be variation in the distinctness and extent of the black throat-patch in these grebes. Rensch (1929) found this patch markedly larger and more distinct in the birds from the Sundas (Java, Lombok and Flores) than in those from Sulawesi and the Moluccas, which led him to separate Sunda populations as a subspecies *vulcanorum*. My data from BMNH and ZMB specimens support this distinction (see also Mees 2006 for specimens from RMNH). Birds with a large and distinct throat-patch occur in the Lesser Sunda Islands (Lombok, Flores and Timor—author's unpublished data from BMNH, Mees 2006, Rensch 1929, 1931) and in the S Moluccas (Buru) (BMNH), while birds from the N Moluccas (Ternate, including the type of *T. tricolor*) and northern Sulawesi (BMNH, ZMB, Stresemann 1941) have only an indistinct dark throat-patch. This difference is the basis of the distinction between subspecies *T.t. tricolor* and *T.t. vulcanorum*. However, two individuals collected at Kelakah, East Java, on 22 October

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1939 had small and indistinct throat-patches (Mees 2006). To clarify the taxonomic value of this character more data are needed on the breeding and non-breeding distributions of Tricoloured Grebes with and without distinct black throat-patches.

White (in White & Bruce 1986) held *vulcanorum* for a synonym of *tricolor* allegedly following Stresemann (1941), but the latter author considered both of these subspecies valid. Fjeldså (2004: 155) listed islands on which *T. t. tricolor* and *T. t. vulcanorum* occur, but without giving the sources of his data, and his list includes some apparent errors. For example, Lombok and Buru are said to be inhabited by *T. t. tricolor* whereas the record from Lombok is limited to two syntypes of *T. t. vulcanorum* (see Myers & Bishop 2005, who listed them as *T. ruficollis*, referring to Rensch 1931). My own observation (see above) is that birds from Buru agree in the colour of the throat-patch with *T. t. vulcanorum*, not with *T. t. tricolor*. The taxonomic identity of birds from the Kei Islands, far-eastern Wallacea, needs confirmation. Mayr (1945) and van Bemmel & Voous (1948) assigned most, including breeding individuals from Du (Kei Dulah), to *vulcanorum*, but two specimens from Nuhu Roa (Kei Kecil) in RMNH were identified by van Bemmel (1948) as belonging to *tricolor* proper. Van Bemmel & Voous (1948) suggested that Nuhu Roa is 'probably [inhabited by] a mixed population', which is unsubstantiated because the breeding status of the RMNH birds was not established and movements of non-breeding individuals between islands are unmapped as yet. Finally, White & Bruce (1986) and Coates & Bishop (1997) listed the Wallacean islands from which Tricoloured Grebe is recorded, but did not distinguish subspecies.

Tachybaptus ruficollis (Pallas, 1764)

Little Grebe is widespread in SNAB territory, but its intraspecific taxonomy is far from understood (see also Fjeldså 2004), even after the dark-bellied, large-billed forms of Wallacea have been separated as *T. tricolor* (above). Asian Little Grebes differ from European and African birds in having yellow, not red eyes, and several groups seem to exist within this Asian yellow-eyed assemblage (Fjeldså 1983, 2004). Western populations (breeding from Iraq to India) are short billed and have much white on their secondaries, whereas eastern populations (eastern China to Japan and mainland SE Asia) have longer bills and much less white on their secondaries. Birds from the northern Philippines have even longer bills, and populations from southern Philippines are similar but have darker, not pure white underparts (see also Meyer de Schauensee 1957 for Mindanao birds). However, alleged intergrades have been reported from localities lying between the core areas of all of these forms, although no detailed analyses of these appear to have been published. For the time being, I accept Storer's (1979) classification of Asian Little Grebes, with one important difference: that I treat yellow-eyed S Asian *'capensis'* as subspecifically distinct from red-eyed African *'capensis'* (see also Fjeldså 2004). *T. r. capensis* (Salvadori, 1884) is herewith restricted to the Afrotropical region. The earliest name applicable to an Asian *'capensis'* population is *Podiceps albescens* Blanford, 1877, the BMNH type of which I have re-studied (see also Fjeldså 2004). This specimen is a partial albino, but it is noteworthy that colour aberrations seem to be not uncommon in grebes (Jehl 1985, King 1973, 1975).

A provisional classification of Asian Little Grebes is thus as follows:

T. r. albescens Blanford, 1877 (described from Nepal), incl. *Tachybaptes albipennis* Sharpe, 1894 (India) and probably also the extralimital *Podiceps ruficollis iraquensis* Ticehurst, 1923;

T. r. poggei Reichenow, 1902 (eastern China), incl. *Podiceps ruficollis japonicus* Hartert, 1920 (Honshu, Japan), and *Podicephalus ruficollis kunikyonis* Kuroda, 1927 (Daito-shima, Ryukyu Islands, Japan);

T. r. philippensis (Bonnaterre, 1791) (type locality restricted by Rand 1948 to Luzon, Philippines);

T. r. cotabato (Rand, 1948) (Mindanao, Philippines).

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Little Grebes have been considered mostly sedentary in Asia (Fjeldså 2004, Llimona & del Hoyo 1992) but while many birds appear to stay in Central Asia over winter these populations at least are partly migratory (Kišinskij 1978, Kuročkin 1982, Kydyraliev & Berezovikov 2007a). Further south, Wells (1999) has reviewed evidence of winter influxes into southern mainland SE Asia, as far as the Thai-Malay Peninsula. At least some of the birds involved appear to be *albescens*.

Podiceps auritus (Linnaeus, 1758)
In the Old World, Horned Grebe breeds in a long belt from north-eastern Europe through southern Siberia to the Okhotsk Sea and Kamchatka. Within SNAB territory, this grebe breeds only in western Mongolia (Fjeldså 2004, O'Donnel & Fjeldså 1997). While its breeding range is compact in the Palaearctic, the species winters in three distinct areas: (1) at sea near north-western Europe, (2) at sea and on inland lakes from the eastern Mediterranean (Adriatic) to Central Asia (eastern Kazakhstan and adjacent parts of north-western China), and (3) at sea from southern Japan to south-eastern China (Fjeldså 2004, Llimona & del Hoyo 1992). It remains to be shown whether disjunct wintering areas have had any effect on the evolution of Horned Grebes. Almost all species-group names applied to Horned Grebe in the Old World were based on specimens from the western Palaearctic (Hartert 1920). Only *Podiceps auritus korejevi* of Zarudny & Loudon, 1902 (a syntype from Iran, others from unspecified localities) has been described from Asia, although still outside SNAB territory. If separable, the east Asian wintering form is unnamed as yet.

Podiceps grisegena (Boddaert, 1783)
Red-necked Grebe has a disjunct breeding range in the Palaearctic (Fjeldså 2004, Llimona & del Hoyo 1992), nowhere certainly entering SNAB limits, but it winters along east Asian coasts south to Guangdong Province, China (Fjeldså 2004, Kuročkin 1982, Zheng 2005). It is also probable, though not proven, that birds from the Central Asian population visit SNAB territory in Pakistan and north-western India in winter (Fjeldså 2004, Rasmussen & Anderton 2005).

Nominotypical *grisegena* Boddaert, 1783 (p. 55) is the breeding form of the western Palaearctic. Further east, taxonomy is less resolved. Bocheński's (1994) suggestion that east Asian to Nearctic *holbollii* Reinhardt, 1854 (p. 76) be given the status of a full species was rejected by Storer (1996) and Fjeldsa (2004) because they showed that Bocheński's arguments were invalid. However, further research may confirm a split as *holbollii* is larger and much longer-billed than nominotypical *grisegena* (e.g., Fjeldså 2004, Storer 1996). Within *holbollii*, Nearctic birds are larger and longer-billed than east Asian individuals (Fjeldså 2004), which may suggest that birds wintering mainly along east Asian coasts (Fjeldså 2004, Kuročkin 1982) and Nearctic birds wintering mainly along Pacific coasts of North America (Stout & Nuechterlein 1999) are two different forms. If separable at a taxonomic (subspecific?) level, the name *bergmani*, published in the combination *Podiceps griseigena* [sic] *bergmani* by Lönnberg (1936: 37; described from Kamchatka) would be available for the east Asian form. An earlier name, *major*, published in the combination *Colymbus rubricollis major* by Temminck & Schlegel (1850: 13; described from Japan), is a junior primary homonym of *Colymbus major* Boddaert, 1783 (see Mlíkovský 2010b, this issue).

Fjeldså (2004: 182) suggested that Red-necked Grebes breeding in Central Asia (Kazakhstan and Kyrgyzstan) 'may represent outposts [of *holbollii*] or intermediate populations [between *grisegena* and *holbollii*]'. Representatives of this form from Kazakhstan had been described by Korelov (1948) as *Podiceps griseigena balchaschensis*. However, Russian and Central Asian authors (e.g., Dement'ev 1951, Kuročkin 1982, Kydyraliev & Berezovikov 2007b, Stepanân 2003) have generally included these populations in nominate *grisegena*. Fjeldså's data on bill-length (published by Storer 1996) support the latter view.

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Podiceps cristatus (Linnaeus, 1758)
Great Crested Grebe is monotypic in the Palaearctic and Oriental Regions, all populations being included in the nominotypical subspecies *cristatus* of Linnaeus, 1758 (p. 135), see, e.g., Dickinson 2003, Fjeldså 2004, Llimona & del Hoyo 1992, Storer 1979, Vaurie 1965. Subspecies *australis* Gould, 1844 (p. 135), of Australia, Tasmania, and New Zealand is well separated from Palaearctic-Oriental populations morphologically and geographically (Rogers 1990). It does not normally reach SNAB territory but a vagrant, possibly of this form, was recorded in 1981 in the Kei Islands, E Wallacea (Coates & Bishop 1997, White & Bruce 1986).

Podiceps nigricollis Brehm, 1831
The Eurasian breeding range of Black-necked Grebe is disjunct (Fjeldså 2004, Llimona & del Hoyo 1992): the western Palaearctic east to central Siberia, reaching SNAB territory only marginally, in Pakistan (Grimmett *et al.* 2008, Rasmussen & Anderton 2005,) and with summer records in Nepal (Inskipp & Inskipp 1991, Rasmussen & Anderton 2005), then north-eastern China with adjacent parts of Mongolia and Russia. Both western and eastern populations are migratory. Western population winterers extend locally into the northern, mainly north-western, Indian subcontinent (Rasmussen & Anderton 2005), while the eastern population winters mainly in Japan, Korea and eastern China. There seems to be no contact between these populations, although Black-necked Grebes are known to have rather erratic movement patterns (Kišinskij 1978, Konter & Konter 2006). All have generally been united in the nominotypical subspecies *nigricollis*, but available synonyms were based exclusively on birds from the western population (Hartert 1920) and the taxonomic status of the eastern population has never been studied in detail. If different, it has yet to be named.

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MUSEUM ACRONYMS

AMNH	American Museum of Natural History, New York
BMNH	Natural History Museum [formerly British Museum (Natural History)], Tring
NMP	Národní muzeum [National Museum], Praha
RMNH	Nationaal Natuurhistorisch Museum (Naturalis) (formerly Rijksmuseum van Natuurlijke Historie), Leiden
SMTD	Senckenberg Naturhistorische Sammlungen (formerly Staatliche Naturhistorische Sammlungen Dresden), Museum für Tierkunde, Dresden
ZMB	Museum für Naturkunde, Leibniz-Institute for Research on Evolution and Biodiversity at the Humboldt University (formerly Zoologisches Museum, Berlin), Berlin
ZMUC	Zoologisk Museum, Københavns Universitet, København

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SYSTEMATIC NOTES ON ASIAN BIRDS: 75

Types of the Podicipedidae

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ABSTRACT This paper follows the format of the series, supplying author(s), date of description and current whereabouts (if known) of Asian types of the family Podicipedidae, but departs from sister paper convention by including details of currently recognized taxa occurring within the series' geographical area ('SNAB territory') but whose type locality lies elsewhere.

KEY WORDS grebe, Podicipedidae, *Podiceps, Tachybaptus,* nomenclature, synonymy, types.

INTRODUCTION

This paper covers the types of the family Podicipedidae. Except as indicated below, its style and format follow those established by Dekker *et al.* (2000). Included are all grebe taxa that occur within 'SNAB territory' (Mlíkovský 2010a, this issue), i.e., Asia south of Russia, east of Iran, and west of Lydekker's Line at the boundary of the Sahul Shelf (Dickinson & Dekker 2000, and see map in the Editor's Foreword), other than as vagrants or rare visitors.

METHODOLOGY

Unlike previous types reviews of the series, coverage in this paper extends to taxa that breed exclusively outside of SNAB territory but regularly visit it in winter. Consequently, I include in the synonymies all nominal taxa described on the basis of material collected within SNAB territorial limits, plus nominal taxa whose type localities are extralimital but whose names apply currently to grebe taxa inhabiting SNAB territory.

The sequence of species follows Storer (1979), but taxonomic decisions reviewed by Mlíkovský (2010a, this issue) are taken into account. Types are listed as 'lost' when I did not find any trace of their current whereabouts. This does not exclude the possibility that some of these specimens will be found in future. Columns in Table 1, below, cover: (1) current name of species/subspecies (bold) and names of relevant nominal species-group taxa in the spelling of their original combination; (2) author(s) of the name; (3) year of taxon description; (4) acronym of a museum in which type(s) of the nominal taxon are confirmed as deposited; and (5) a number referring to a paragraph in the 'Comments' section.

For details of the type specimens of grebes in the American Museum of Natural History (AMNH) see Greenway (1973), for those in the Natural History Museum at Tring (BMNH) see Warren (1966). During 2007–2009, I personally checked the type specimens held at Berlin (ZMB), København (ZMUC), and Tring (BMNH).

RECENT BIBLIOGRAPHICAL HISTORY OF THE FAMILY

My starting point for this history is a review of the family Podicipedidae by Storer (1979) in the second edition of Peters's *Check-list of Birds of the World*. Since that time, monographs of the family have been published by Llimona & del Hoyo (1992), O'Donnel & Fjeldså (1997), Ogilvie (2003) and Fjeldså (2004), and a working bibliography was compiled by Vlug & Fjeldså (1990). For subsidiary papers on the evolution and systematics of grebes see Mlíkovský (2010a, this issue).

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Table 1. Species-group names of taxa of the Podicipedidae occurring within SNAB territory, and author(s), date and whereabouts of associated types

Name	Author	Date	Museum	No.
Tachybaptus novaehollandiae				
Tachybaptus n. novaehollandiae				
Podiceps Novae Hollandiae	Stephens	1826	lost	1
Podiceps novaehollandiae javanicus	Mayr	1943	AMNH	
Podiceps novaehollandiae timorensis	Mayr	1943	AMNH	
Tachybaptus n. fumosus				
Podiceps novaehollandiae fumosus	Mayr	1943	AMNH	
Tachybaptus tricolor				
Tachybaptus t. tricolor				
Podiceps (Sylbeocyclus) tricolor	Gray	1861	BMNH	2
Tachybaptus t. vulcanorum				
Podiceps ruficollis vulcanorum	Rensch	1929	ZMB	3
Tachybaptus ruficollis				4
Colymbus ruficollis	Pallas	1764	lost	5
Tachybaptus r. albescens				6
Podiceps albescens	Blanford	1877	BMNH	7
Tachybaptes albipennis	Sharpe	1894	lost	8
Tachybaptus r. poggei				
Tachybaptus ruficollis poggei	Reichenow	1902	ZMB	
Podiceps ruficollis japonicus	Hartert	1920	AMNH	
Poliocephalus ruficollis kunikyonis	Kuroda	1927	lost	9
Tachybaptus r. philippensis				
Colymbus Philippensis	Bonnaterre	1791	lost	10
Tachybaptus r. cotabato				
Podiceps ruficollis cotabato	Rand	1948	FMNH	
Podiceps auritus				
Colymbus auritus	Linnaeus	1758	–	
Podiceps grisegena				
Podiceps g. grisegena				
Colymbus grisegena	Boddaert	1783	lost	11
Podiceps g. holbollii				
Podiceps Holböllii	Reinhardt	1854	ZMUC	12
Podiceps rubricollis major	Temminck & Schlegel	1850	lost	13
Podiceps cristatus				
Podiceps c. cristatus				
Colymbus cristatus	Linnaeus	1758	–	
Podiceps nigricollis				
Podiceps n. nigricollis				14
Colymbus caspicus	Hablizl	1783	lost	15
Podiceps nigricollis	Brehm	1831	AMNH	

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COMMENTS ON TABLE 1

1. This species was based on the 'New Holland Grebe' of Latham (1824: 33) and its type locality is New South Wales (Peters 1931, Storer 1979).
2. The description of this species was published in 1861 (Duncan 1937, Richmond s.d.), not in 1860 as sometimes given.
3. A paratype is deposited in the SMTD (Eck & Quaisser 2004).
4. The older literature frequently lists Little Grebe as *Colymbus fluviatilis* Tunstall, 1771, or *Podiceps minor* Gmelin, 1789. Tunstall's *Colymbus fluviatilis* is not available for the purposes of zoological nomenclature, because Tunstall's (1771) booklet was placed on the Official Index of Rejected and Invalid Works in Zoological Nomenclature (Direction 38—see Melville & Smith 1987: 320).
5. For the publication of Pallas (1764) see Richmond (1905), Sherborn (1905), van Oort (1912), Stone (1912), and Rookmaaker & Pieters (2000). This species was described from Europe and the nominotypical subspecies does not occur in SNAB territory.
6. This subspecies has usually been merged with the Afrotropical form *T.r. capensis* (Salvadori, 1884), and the latter name has been frequently applied to birds from S. Asia.
7. Blanford (1877: 486) described this species from a specimen in the Louis Mandelli collection (see Pinn 1985 for this person), and attributed the species to him, as follows: 'Podiceps albescens, *Mandelli, Sp. Nov.*' (Blanford's italics). In spite of this, Blanford is to be regarded as the author of *albescens* (ICZN 1999, Art. 50.1).
8. Current whereabouts of the holotype of this species is unknown, but it was illustrated by Ogilvie-Grant (1898, pl. VIII).
9. The holotype was in the Nagamichi Kuroda collection, but was probably destroyed in World War II (Kakizawa 1980, Morioka *et al.* 2005).
10. The original spelling of this name is *philippensis*; *philippinensis* used by some authors is an incorrect subsequent spelling.
11. The original spelling of this name is *grisegena*. Frequently used *griseigena* is an incorrect subsequent spelling.
12. Reinhardt (1854) published the species name as "Holböllii". Following the provisions of the ICZN (1999, Art. 32.5.2) this spelling is to be corrected to *holbollii* (see also Peterson 2009). Frequently used *holboellii* is an incorrect subsequent spelling because Carl Peter Holböll (1795–1856) was a Danish, not a German naturalist (Wikipedia 2009).
13. Morioka *et al.* (2005: 138) concluded that *major* of Temminck & Schlegel (1850) was not a new name but an application of *Podiceps major* Gray, 1846, referring to 'Gen. Bds., 3: 633', and stated that Gray's *major* is preoccupied by *Colymbus major* Boddaert, 1783. However, Gray (1846: 633) listed only 'Podiceps major (Bodd.)' with *C. cayennensis* Gmelin and *C. cayanus* Latham as its synonyms. This indicates that Gray (1846) used Boddaert's *major* in the same sense as it is used today (*Podiceps major* (Boddaert, 1783)) and that no *Podiceps major* Gray ever existed. Temminck & Schlegel (1850: 122) called their *Podiceps rubricollis major* 'La Grébe à Joues Grises du Japon', stating in the description (p. 123) that it is similar to the European form of the Red-necked Grebe, but larger, which is reflected in the name *major* they used to denote the Japanese form. I thus conclude that *Podiceps rubricollis major* Temminck & Schlegel is available for the purposes of zoological nomenclature and that it was based on birds from Japan. This name is preoccupied in the genus *Podiceps* Latham, 1787, by *Colymbus* (= *Podiceps*) *major* Boddaert, 1783. For the publishing date of *P. r. major* Temminck & Schlegel see Holthuis & Sakai (1970) and Morioka *et al.* (2005).

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14. Note that *Podiceps orientalis* Brehm, 1855, was described from the Red Sea (Brehm 1855: 402), not from SNAB territory.
15. Hablizl's (1783) *Colymbus caspicus* was considered a synonym of *Colymbus* (= *Podiceps*) *auritus* Linnaeus, 1758 (e.g., Ogilvie-Grant 1898: 528, Hartert 1920: 1450) until Stresemann (1948) discovered that the description applies to Black-necked Grebe, then widely known as *Podiceps nigricollis* Brehm, 1831. The International Committee on Zoological Nomenclature subsequently suppressed *Colymbus caspicus* Hablizl for the purposes of the Principle of Priority, though not for those of the Principle of Homonymy (Opinion 406—see Hemming 1956, Melville & Smith 1987: 208), thus reinstalling Brehm's (1831) *nigricollis* for the species. The type locality of *Colymbus caspicus* Hablizl is Bandar-e Anzali, northwestern Iran (Mlíkovský 2008), while *P. nigricollis* was described from Germany (Brehm 1831).

MUSEUM ACRONYMS

AMNH American Museum of Natural History, New York.
BMNH Natural History Museum, [formerly British Museum (Natural History)], Tring.
FMNH Field Museum of Natural History, Chicago.
SMTD Senckenberg Naturhistorische Sammlungen (formerly Staatliche Naturhistorische Sammlungen Dresden), Museum für Tierkunde, Dresden.
ZMUC Zoologisk Museum, Københavns Universitet, København.

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SYSTEMATIC NOTES ON ASIAN BIRDS: 76

A Second Contribution to the Ornithology of Bangka Island, Indonesia

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ABSTRACT The status, taxonomy and/or nomenclature of 13 of the species listed by Mees (1986) as recorded from Bangka Island, Indonesia, is re-assessed and additional information presented on certain of the collectors and collections involved.

KEY WORDS avifauna, Bangka, Borneo, Java, priority, Sumatra, synonymy, Thai-Malay Peninsula, types.

INTRODUCTION

More than twenty years have passed since the publication of my review of the avifauna of Bangka (Mees 1986) and, inevitably, several inaccuracies and errors occurring in that work have come to light: some as a result of my own continued studies, some pointed out by other workers. Enough of such necessary corrections and clarifications has now accumulated to justify their publication in this supplementary paper. Taxon sequence and page referencing follow the 1986 paper.

SYSTEMATIC LIST

Gorsachius melanolophus (Raffles) (Malayan Night Heron)

See pages 22 and 169. *Gorsachius melanolophus* was listed as a resident on Bangka but it is more likely to be a winter visitor (cf. Marle & Voous 1988), although its movements are far from well understood.

Rhaphidura coracina (F. Boie) (Silver-rumped Spinetail)

See page 56. *Chaetura leucopygialis* (Blyth) should be replaced by *Rhaphidura coracina* (F. Boie). There has been controversy over the question of whether *Acanthylis leucopygialis* Blyth or *Acanthylis coracina* Bonaparte (ex S. Müller) had priority. With Blyth's description dated 1849 and Bonaparte's 1850, the question seemed decided in favour of *leucopygialis*. However, Müller's MS-name was first validated not by Bonaparte but six years earlier by F. Boie (1844), giving it ample seniority over Blyth's name. The generic name is altered to conform with current practice.

Chrysocolaptes guttacristatus indomalayicus Hesse (Greater Flameback)

See page 70. *Chrysocolaptes lucidus indomalayicus* becomes *Chrysocolaptes guttacristatus indomalayicus*. Although I provided evidence that on Java *C.l. 'chersonesus'* and *C.l. strictus* are not conspecific, I was then still reluctant to break up the extended species *C. lucidus* as accepted by recent authors. Ten years later (Mees 1996: 32–35), I regarded the evidence as so convincing that a dismemberment of the widely ranging and highly variable *C. lucidus* of authors could no longer be postponed, and suggested a division into at least three, probably four, species.

As far as Java was concerned: the separation of *C. guttacristatus* and *C. strictus* was based on conspicuous morphological (eidonomical) differences, also on the fact that their ranges almost meet, without any sign of hybridisation. Later, I came across a record of an observation of supposed *strictus* from Tjiomas-Salak (Hoogerwerf 1948: 104, 127) that halved my previously recorded small gap between *strictus* and *guttacristatus*. Unfortunately, this sighting lacked supporting evidence and, therefore, is difficult to evaluate. If a female was observed there would be no doubt about the identification. but I doubt that males of *guttacristatus* and *strictus*, leave alone a possible hybrid, can be separated in the field.

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In recent years, several authors have discussed members of the *Chrysocolaptes lucidus* group and have also commented on my work. Wells (1999: 566–567) argued for recognition of *chersonesus* on the sole basis of small size, although agreeing that it is not an isolate, and that there is a cline towards smaller size from north to south, making the northern limit of the resurrected *chersonesus* in the Thai-Malay Peninsula quite arbitrary. It is unnecessary to repeat here Wells's whole discussion, but he concludes with the statement (about the resurrected *chersonesus*) that : 'To deny them their name *chersonesus*. . . . is out of line with treatment of other woodpeckers of the area'. My own position remains unchanged: birds of southern Malaya and the opposite coast of Sumatra show a tendency toward small size. From the meagre material examined, and literature, it looks as if about one-third of the individuals of this region have a wing-length below the minimum found in Java and southern Thailand. The fact is interesting and should not be denied, but it means that two-thirds of the Malayan/Sumatran birds are not separable. Wells mentions a specimen from Singapore with a wing-length of 158 mm, above the average for Javan birds. I consider that a population (of any species) of which no more than one-third is identifiable, should not be separated as a distinct subspecies. Whether this is in line with the treatment of other woodpeckers in the region is irrelevant, but I note that in the case of *Picus puniceus* Wells has taken the opposite view, and agrees with Short (1982: 457) and me (Mees 1986: 67) that a subspecies *continentis* based on average larger size should not be recognised, thus contradicting his own statement. I regard *indomalayicus* itself as a shaky subspecies, and have stated this (Mees. 1986: 72). It might better be placed in the synonymy of nominate *guttacristatus* (cf. Short 1982); unless the priority of *Picus Peralaimus* Wagler (see my 1986 paper) is accepted.

Wells made no mention and may not by then have been aware of my definite proposal to split the *C. lucidus* complex into several species, but this was discussed by Davison in Smythies (1999: 415). Apparently not having read my 1986 paper, in which the Bornean form *andrewsi* is discussed and its close resemblance to *indomalayicus* stressed, he believed that I would place *andrewsi* with the Philippine species *lucidus*. Thus his rejection of my conclusion was based on a misunderstanding. He further refers to Winkler *et al.* (1995), a work not available to me, but it seems illogical to use a paper published in 1995 to reject my proposals made in 1996.

With some hesitation, I further mention the work of Winkler & Christie (2002: 546–547). These authors have retained the one all-encompassing species, although in their bibliography both my 1986 and 1996 papers are listed. A work of that kind is not the place for systematic and nomenclatural discussions, so that the obvious conclusion is that the authors have read and rejected my conclusions, which is their perfectly good right. But then I found under *Celeus brachyurus* (Winkler & Christie 2002: 517) that the form from Malaya and Sumatra is listed as *squamigularis*. My 1986 paper is referred to, but in that paper the one and only thing I said was that if *squamigularis* and *badius* are to be united, the name *badius* is the valid one, having 44 years priority over *squamigularis*. This is not a controversial issue, suggesting either that the authors had not read my work or that, in this multi-author production, perhaps somebody other than the authors of the text was responsible for the list of references. Incidentally, I have not yet seen the paper by Bock & Short cited as MS by Short (1973: 363) in which the transfer of the monotypic *Micropternus* to *Celeus* was to be justified. It therefore remains an arbitrary decision, but see Fuchs *et al.* (2006) who conclude from DNA data that *Celeus sensu lato* is polyphyletic.

Pitta sordida bangkana Schlegel (Hooded Pitta)

See pages 18 and 83. The expression 'stabilized hybrid' sounds so fine that I gave in to the temptation of using this term in the discussion of *P. s. bangkana*. However, this apparent hybrid population is far from stabilized; on

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the contrary, it seems that no two birds are exactly alike in the pattern of brown and black on the crown. More generally, I am not aware of any example of a hybrid population having stabilized, although it is possible, theoretically, for one of the two parent forms to have become so dominant that the characters of the other component are finally bred out. This is a reason why the tacit assumption that *Passer italiae* of the Italian peninsula is of hybrid origin, although it is perfectly stable except for obvious hybridisation near the edges of its range, cannot possibly be correct.

Lalage nigra striga (Horsfield) (Pied Triller)
See page 84. In place of *Lalage nigra* subsp., read: *Lalage nigra striga* (Horsfield). For this change see Mees (1996: 38–39).

Pycnonotus plumosus plumosus Blyth (Olive-winged Bulbul)
See pages 92–100. I mentioned my inability to contribute to the discussion of eye-colour as a subspecific character in Sumatra, because very few of the examined specimens had the iris colour recorded on their labels. It will, therefore, be clear that I accepted *P. plumosus porphyreus* from western Sumatra in the belief that it differed from nominate *plumosus* merely by having orange eyes, on the basis of literature only. Usually, when I am unable to verify the validity of a proposed subspecies independently, I accept it. In view of claims of both age-related and local variability of the iris colour in certain related species, I should perhaps have added my opinion that the validity of *porphyreus* requires confirmation.

Ixos charlottae (Finsch) (Buff-vented Bulbul)
See page 103. As Dickinson & Dekker (2002: 104) pointed out, the trinomial given was in error as I do not recognise subspecies. Following the generic review by Dickinson & Gregory (2002), in which the genus *Iole* was resurrected, Dickinson & Dekker used for this species the name *Iole olivacea*. But *olivacea* had been rejected as a secondary homonym and replaced by *charlottae* (the name next in seniority) well before 1961, hence it remains rejected (ICZN 1999: art. 59.3). The same pertains to the name *Iole virescens* Blyth, a secondary homonym that the author had replaced with *Iole viridescens* Blyth as long ago as 1867.

Dickinson *et al.* (2002: 143) further claimed that I had made a lectotype of the syntype of *I. charlottae* in the Senckenberg collection, with a reference to ICZN 1999: art. 74.6.1. That article is not applicable and in order to show this I quote the relevant passage: 'When it has been accepted that a nominal species-group taxon was based on a single specimen and the original description neither implies nor requires that there were syntypes . . . , the first author to have published before 2000 the assumption that the species-group taxon was based upon a single type specimen is deemed to have designated that specimen as the lectotype'.

When reading the description of *charlottae* I believed that only the single Senckenberg specimen was mentioned. In fact, Finsch (1867: 19) had concluded his description with the following paragraph: 'Das Leidener Museum besitzt diese Art in 10 Exemplaren von Borneo und Sumatra, unter dem unpublicirten Namen Trichophorus brunnescens Müll'. Thus Dickinson *et al.* (2000.) were perfectly right in pointing out that there were syntypes in Leiden. They were not correct, however, in stating that I had made the Senckenberg specimen a lectotype. My assumption had been that the Senckenberg specimen was a holotype, but in view of Finsch's clear statement that there were 11 syntypes, this was based on sloppy work. The article of the Code quoted above concerns cases in which, from the original description, it is impossible to deduce whether there was more than one type. My assumption of a holotype was therefore simply an error, which does not affect the status of any of the 11 syntypes.

The Leiden material extends the type locality as originally given to 'Borneo und Sumatra'. This has generally been restricted to Borneo. Previously, I argued that the further restriction of the type-locality to Banjarmasin by Deignan (1948) could not be correct as the Senckenberg specimen had been received before any collectors had visited that place. With the addition of the Leiden syntypes,

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however, specimens from that locality collected by Schwaner and Croockewit are added to the type-series, and make Banjarmasin fully acceptable as the restricted type locality.

The above situation compares with my previous discussion of the name *Picus Peralaimus* Wagler (cf. Mees 1986: 78). Stresemann had referred to a specimen in Munich as 'der Typus', but as in its description Wagler mentioned other material, Stresemann's publication should not be accepted as a lectotype designation.

Copsychus saularis musicus (Raffles) (Oriental Magpie Robin)

See pages 109–119. Even as late as 1996 (Mees 1996: 100), I was not clear about the way this subspecies had colonised Java, but am now convinced that, like its congener *C. malabaricus tricolor*, it arrived from Sumatra during the last period of low sea-level. The only difference is that *C. saularis* has advanced further east than other recent Sumatran colonists. The assumption that *musicus* has replaced the black-bellied *amoenus* in western Java finds support in the fact that within the range of *musicus* in western Java, occasional individuals with more or less black on the belly turn up (see also Sheldon *et al.* 2009).

Macronous gularis bornensis (Bonaparte) (Striped Tit Babbler)

See pages 126–127. For the trinomen *javanica*, read *javanicus* (twice). (See Dickinson & Cleere, pp. 37–40 of this issue, for an alternative spelling of the generic name).

Macronous ptilosus trichorrhos (Temminck) (Fluffy-backed Tit Babbler)

See page 127. *Macronous ptilosus trichorrhos* (Temminck) replaces *M.p. reclusus* Hartert. In spite of its fairly compact range and simple pattern of geographical variation, *M. ptilosus* has not been particularly well treated by successive generations of systematic ornithologists. As its nomenclature needs an overhaul an historical review is presented here, followed by my conclusions.

The species was described by Jardine & Selby (1835) under the binomen it still bears, and the following year again by Temminck (1836) as *Timalia trichorrhos*. Jardine & Selby recorded the provenance of their type specimen of *M. ptilosus* as Java or Sumatra (their exact words will be cited below). Temminck gave as range of his *T. trichorrhos*, Borneo and Sumatra, and especially stressed its absence from Java. For the next eighty years, no geographical variation was recorded in the species and, accordingly, *T. trichorrhos* was treated as a synonym of *M. ptilosus*. Then Hartert (1915) noted that birds from Borneo on the one hand and those from Sumatra and Malaya on the other differed by the latter having a patch of ashy grey mid-ventrally on the belly. As Temminck mentioned a grey ventral patch in his description of *T. trichorrhos*, Hartert concluded that it applied to Sumatran rather than to Bornean birds. He therefore restricted the range of nominate *ptilosus* to Sumatra and Malaya, keeping *trichorrhos* in its synonymy, and described the Bornean birds, left without a name, as *M.p. reclusus*. In the nineteen thirties, three more nominal races were described, from smaller islands: *M.p. batuensis* Riley, 1937 (Batu Islands), *M.p. minor* Riley, 1937 (Bangka) and *M.p. sordidus* Chasen, 1937 (Billiton [=Belitung]).

Delacour (1947: 257) presented a classification in which nominate *ptilosus* ranged over Malaya, southern Sumatra, and Bangka, *sordidus* (type locality Belitung!) over northern mainland Sumatra, and *reclusus* over Borneo and Belitung. He made no mention of the races *batuensis* and *minor*, which probably meant that he did not recognise them. These errors drew the attention of Deignan (1950), who presented a short revision. Deignan restored *minor* to Bangka and *sordidus* to Belitung but simultaneously noted that, with the inclusion of *Mixornis* in *Macronous*, the name *minor* had become preoccupied. He concluded that birds from Bangka and Belitung are identical and constitute a separate subspecies confined to the two islands, for which he used the name *sordidus* (*minor* having been rejected as a homonym). Deignan also mentioned casually that he failed to see much difference between birds from Malaya and Sumatra but that, if they did differ, *trichorrhos* was available for

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Sumatran birds. A few years later, and without further comment, he (Deignan 1964: 325) listed *trichorrhos* as the subspecies of the whole of Sumatra. In addition, Deignan (1963: 147) had something to say about the type locality of nominate *ptilosus*: 'type locality inferentially restricted to the Malay Peninsula and Sumatra by Hartert (1915)' 'and inferentially further restricted to Malacca, by Chasen (1935: 227)'.

In my review of the avifauna of Bangka, I concluded that the characters used by Deignan and earlier workers to separate a special subspecies, *sordidus*, endemic to Bangka and Belitung, are invalid, and that birds from these islands agree perfectly with specimens from Borneo, at that time known as *reclusus* (Mees 1986: 127–130). Interestingly, I also noted that Temminck's illustration of *Timalia trichorrhos* does not show a grey ventral patch. The figured type specimen, as well as two other syntypes, are still in the RMNH collection, and all three are from Borneo (see my 1986 paper), although one is mislabelled with the provenance Sumatra. At the time, I resisted drawing the obvious conclusion that *trichorrhos* had to replace *reclusus* as the valid name for the subspecies from Borneo. Apart from a certain reluctance to change current nomenclature, my reason for not making the change was that at that time the subspecies from Sumatra was known as *trichorrhos*, and that from Borneo as *reclusus*. Because I wanted to emphasise that it was the Bornean, not the Sumatran, subspecies that occurs on Bangka I feared confusion if I applied the name then in use for the Sumatran subspecies. In retrospect, this was an erroneous decision.

The recent understanding has been that *M. ptilosus* has three subspecies: the nominate one in Malaya (type locality Malacca), *trichorrhos* in Sumatra, *reclusus* (but, as shown above, to be replaced by *trichorrhos*), in Borneo, Bangka and Belitung. However, much in this classification is still unsatisfactory. To begin with, Jardine & Selby (1835) described the provenance of the type specimen of nominate *M. ptilosus* in the following words: 'We purchased the skin, with a collection of about fifty birds, said to be brought from the islands of Java and Sumatra, which we had no reason to doubt, the others being mostly Javanese species'. There has never been any suggestion that this provenance could be incorrect. As the species does not occur in Java, surely the type locality is Sumatra, where it does occur. It seems completely illogical to shift it to Malacca, outside the range originally given. In this connection, Deignan's claim about an 'inferential restriction' by Chasen (1935) requires discussion. Chasen did not inferentially or otherwise restrict the type locality to Malacca, but simply copied it from previous workers on the Malayan avifauna (e.g., Robinson & Kloss 1924: 302). Presumably, it appeared originally in some well-known earlier work, and was uncritically copied by later workers. Evidently, the true type locality of nominate *ptilosus* is Sumatra, not Malacca. Following Deignan, this leaves the Malayan population without a name. But no other worker, either before Deignan or since (cf. Benson 1999: 121), has been able to distinguish Malayan from Sumatran specimens, so that they all may come under the nominate race.

This eliminates *trichorrhos* as a subspecies occurring in Sumatra, but that is not the end of it. In my previous paper I provided strong evidence that *trichorrhos* is the correct name for the Bornean, not the Sumatran subspecies. One wonders whether, perhaps, when Temminck named *trichorrhos*, he had already received Jardine & Selby's description, and had taken the grey patch from that. It would also explain his explicit statement that the species does not occur in Java. That he still applied his own name need not cause wonder as in those days priority of naming was frequently used over priority of publication.

However this may be, Temminck's illustrated type specimen is from Borneo and, under the Code, is the recommended and obvious lectotype. I designate it here as such. Given the way Temminck worked, it has some significance that he gave the range as Borneo and Sumatra, Borneo listed first. Deignan (1964) altered this in a subtle way (perhaps unconsciously) to Sumatra and Borneo!

In conclusion, *M. ptilosus* can be divided in two subspecies:

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M. ptilosus ptilosus Jardine & Selby 1835 (type locality Sumatra): Thai-Malay Peninsula and Sumatra; Batu Islands.
M. ptilosus trichorrhos (Temminck 1836) (type locality Pontianak, Borneo): Bangka, Belitung and Borneo.

Orthotomus ruficeps cineraceus Blyth (Ashy Tailorbird)
See page 133. For *Orthotomus ruficeps ruficeps*, read: *Orthotomus ruficeps cineraceus* Blyth. In agreement with other authors, including Watson (in Watson *et al.* 1986a: 183) and Marle & Voous (1988: 182), I now consider *cineraceus* as a weakly differentiated but valid subspecies (Mees 1996: 82).

Muscicapa dauurica dauurica Pallas (Asian Brown Flycatcher)
See page 134. Read *Muscicapa dauurica dauurica* Pallas for *Muscicapa latirostris latirostris* (see Watson in Watson *et al.* 1986b: 318). Although I have been unable to verify the matter, Watson's argument, including the fact that Pallas's name has been in continuous use by Russian ornithologists, is convincing.

Pachycephala cinerea cinerea (Blyth) (Mangrove Whistler)
See page 135. For *Pachycephala grisola grisola* read *Pachycephala cinerea cinerea* (Blyth). I used the name *P. grisola* following Mukherjee (1970) who had found in the Zoological Survey of India collection, Calcutta, a specimen he took for the holotype of *P. grisola*. Walters (2003), however, has cast doubt on the type status of this individual, so here we go again, hopefully, but perhaps not probably, for the last time.

COLLECTORS AND COLLECTIONS

Bernard Hagen

See page 14. There is little doubt that the nine specimens claimed as 'missing' from Hagen's collection in Munich had been mounted for display, as indeed was mentioned in a note about one of them. Some of these, such as the pair of *Lophura ignita*, would make spectacular display pieces, but during my visit in 1982 the display galleries were closed and their contents inaccessible (a new building was under construction). This means, of course, that these nine specimens are not really missing and that the Munich section of Hagen's collection is still intact.

Johan Adriaan Buddingh

See page 158. The concluding lines of the biography of J.A. Buddingh are confused and should read: "He arrived on Bangka in August 1864 (Steenis-Kruseman 1950: 86). His last posting was to Padang (Sumatra) in June 1869. He died in Batavia (Java) on 16 August 1870".

Andries Hoogerwerf; a note on his diaries

Most regrettably, Hoogerwerf's diaries were destroyed, but an explanation of the circumstances will be of historical interest. Only a few weeks after his sudden death (5 February 1977) I received a telephone call from Mrs Hoogerwerf, who told me that in her house at Castricum there were a few cases with remnants, as she called them, of his egg collection and asked whether I (or rather the Leiden museum) would be interested. Of course I was, and with a chauffeur and an assistant, I went to Castricum in the museum's utility. The haul was considerable, for what had been described as 'remnants' was in fact Hoogerwerf's whole egg collection, closely packed in tins, between layer upon layer of cottonwool. We were told by Mrs Hoogerwerf that the library (books and reprints) had been donated to the WNF, and that all his correspondence had already been put out with the rubbish. As Hoogerwerf was in contact with many leading ornithologists of his time, I was sorry to hear this. Walking through the house, I noticed a large number of wooden boxes and was informed that these contained the glass negatives of his earlier photographs (from the nineteen thirties, before he switched to a Leica). Mrs Hoogerwerf informed me that she did not know what to do with them, and probably would also put them with the rubbish. Naturally, I begged for this material too. Many of Hoogerwerf's bird photographs have been published, but there were also

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photographs of daily life, such as fishermen at work; everything meticulously registered in exercise books. In short, this was a most valuable documentation of a period not so long ago but which now already seems so. Finally, there were the diaries, stacks of them. Mrs Hoogerwerf said that she wanted to consult the children about them first, but evidently attached no sentimental or other value to them. I enquired whether the diaries contained any matter of a personal and confidential nature, but was told that they were exclusively about his natural history interests.

I fully appreciated that the children should have a say in the disposal of the diaries. Having already received far more than I expected, and also because I always think that there is something unclean about the human vultures converging on a corpse barely dead, to search for pickings, I did not try to apply pressure. Instead, I asked Mrs Hoogerwerf to inform me if she was no longer interested, and this she promised to do. About 18 months later, while studying Hoogerwerf's New Guinea collection, I came across a clutch of eggs of *Myiagra alecto* from Frederik Hendrik Island, with a note on its label referring to a diary. I telephoned Mrs Hoogerwerf, with whom I had not had contact since soon after my visit, and asked permission to consult the relevant volume of the diaries. To my horror, Mrs Hoogerwerf replied that she had thrown them out long ago, her promise to inform me evidently forgotten. So that was the end of that. I cannot help blaming myself for not having been sufficiently pushy.

I consider not having secured Hoogerwerf's diaries as one of my more significant failures during the period of my curatorship in Leiden.

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Letter to the Editor

Thoughts about the type specimen of *Pitta baudii* Müller & Schlegel

In their enumeration of the type specimens of the Pittidae, Dickinson *et al.* (2000: 105) listed the type of *Pitta baudii* as being present in the Leiden Museum (RMNH) collection, where indeed one would expect it to be. They stated that according to a note on its label (which is not the original) it was the bird figured by Müller & Schlegel, and had been published with that information on several occasions (e.g., Schlegel 1863: 5). Dekker & Dickinson (2001) noted that the original description of *P. baudii*, and its accompanying plate (no. 2), were based on a specimen collected by S. Müller, the only one at that time available in Leiden, hence a holotype. They had also become aware through a publication by Husson & Holthuis (1955) that the plate issued in 1839 had been considered unsatisfactory by Temminck (the editor of Müller & Schlegel's work) as its colours had faded badly, and that it had been replaced by an entirely new one, issued in 1845. To distinguish it from the original plate 2, this new plate received a roman number II.

Dekker & Dickinson further noted that all four specimens in the RMNH Old Collection (including the bird marked as the illustrated one) bear the collector's name C.A.L.M. Schwaner, and that there is no specimen labelled as from S. Müller. They concluded that the original specimen collected by Müller was no longer present in Leiden, having been lost or, perhaps, exchanged. At the same time, they accepted the specimen marked as such as having been the model for plate II, also that it had been collected by Schwaner whose Borneo material they state (twice) had been received in Leiden in 1843—the new plate having been commissioned probably in 1844.

In fact, Dekker & Dickinson had not studied chronology well enough. The data available actually show as follows: (i) that Schwaner reached Java in August 1842 and stayed there for 14 months, placing his arrival in Borneo as not before October 1843 (Steenis-Kruseman 1950: 478–479); (ii) that Temminck reported the commissioning of the new plate of *P. baudii* to the Ministry of Internal Affairs on 11 November 1844, hence it may be assumed that by around that date the specimen to be illustrated was in the hands of artist Joseph Wolf; (iii) that the replacement plate (II) was formally issued on 26 June 1845 (Husson & Holthuis, 1955); and (iv) that Schwaner's first Borneo collection arrived in Leiden in 1845 (Franssen *et al.* 1997: 294), others as late as 1851 (Steenis-Kruseman 1950: 479) (from the annual reports for those years it might be possible to trace the exact dates of arrival and, perhaps, even the inventories of Schwaner's shipments).

From this it is clear that Dekker & Dickinson's surmise that Schwaner's specimens arrived in 1843 is incorrect. As noted above, I agree that the new plate was probably at least started in 1844, but at that time the only specimen available was that collected by Müller; no Schwaner specimen could possibly have served as the model for plate II. It therefore follows that evidence provided by the label (I repeat, not the original one!) is contradictory, and partially provable incorrect. Either the specimen is indeed the illustrated one, in which case it could not have been collected by Schwaner, or it was collected by Schwaner, in which case it cannot be the bird illustrated.

From the conflicting statements on the label, on the face of it, the chance that the name Schwaner is attributed wrongly and that the specimen actually is the type collected by Müller has to be 50:50. At the same time, it is easy enough to imagine that a copyist of the day, unaware of the importance of proper labelling (and all labelling was haphazard at that time), confronted by four specimens of which three had been collected by Schwaner, after writing the name Schwaner several times, mechanically and without checking wrote it again on the fourth label. A note about one particular bird having been illustrated, on the other hand, is much more likely to have been copied to the correct label. On that basis (and

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other, similar considerations), I regard it as very likely that the specimen in question *is* the 'lost' type.

The value of the type of a well-described species of limited range and no geographical variation is more historical and sentimental than scientific, but Decker & Dickinson expressly invited comments on their note, hoping that the type specimen might be traced to some foreign collection. As such, my conclusion that the specimen is after all right there in Leiden is worth presenting.

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Corrections and additions to *Systematic notes on Asian birds* 41–48 in *Zoologische Verhandelingen, Leiden* 350

p. 71 *O.x. madaraspatanus* is an incorrect spelling, as it was in Greenway (1962: 134); the original spelling is *maderspatanus*.

p. 119 ***Dendrocitta bayleyi*** must be corrected to ***Dendrocitta bayleii***, see *Ibis* 1863, p. xiv 'Errata et Emendanda'.

p. 119 *D*[*endrocitta*]. *bazlei* [sic] 'Tytler' Blyth, 1863 should be corrected to the above (as it should be also on the next line). For 'Blyth' in the authorship column read 'Tytler in Blyth'. In both of the papers cited, Blyth placed Tytler's name and description in quotation marks.

p. 123 *Corvus florensis* was wrongly dated 1894; that is indeed the volume year but the latter's list of contents dates this part to August 1893.

p. 125 *Corvus corax subcorax*: this name was attached to a specimen of *Corvus ruficollis*, not of *C. corax* (see Cramp *et al.*, 1994: 206); thus the correct name for this population is *C.c. laurenci*.

p. 138 For 'Büttikofer, J. 1894' read 'Büttikofer, J. 1893' (and see p. 123, above).

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News and Notices

Chinese Birds—a new ornithological journal

The China Ornithological Society and Beijing Forestry University announce the launch of their new ornithological periodical, *Chinese Birds*, the inaugural issue of which appeared in March 2010. Published jointly by these two organizations, this addition to the world of avian science journals will feature original, peer-reviewed articles, reviews, short communications and notes from authors around the world and will cover the full international spectrum of topics in ornithology, including research on fossil birds. Frequency of publication will be quarterly, at a rate of about 80 pages per issue.

The editorial board of *Chinese Birds* is international. Professor Guangmei Zheng from Beijing Normal University takes the position of Editor-in-Chief; other members are well-established scientists from universities, institutes or associations in China, the USA, the UK and Germany. As of now, the new journal is also adopting an online submission/review system—ScholarOne Manuscripts, developed by Thomson Reuters, which will further help promote academic exchange by streamlining the editorial and publication process.

For additional detail, and instructions on submitting and reviewing manuscripts, authors and readers are directed to the journal's website: www.chinesebirds.net. Alternatively, contact Pengjun Cheng at the Editorial Office, as follows:

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Place names: A series checklist of standard spellings is being compiled by the Editor. Note that compass direction adjectives in region-level names are one word, spelled in full, e.g., Southeast Asia.

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